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DIESEL RAILWAY TRACTION SUPPLEMENT

The February issue of THE RAILWAY GAZETTE *Supplement, illustrating and describing developments in Diesel Railway Traction, is now ready, price* 1s.

GOODS FOR EXPORT

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export

DISPATCH OF "THE RAILWAY GAZETTE" OVERSEAS

We would remind our readers that there are many overseas countries to which it is not permissible for private individuals to send printed journals and newspapers. THE RAILWAY GAZETTE *possesses the necessary permit and machinery for such dispatch, and any reader desirous of arranging for copies to be delivered to an agent or correspondent overseas should place the order with us together with the necessary delivery instructions.*

We would emphasise that copies addressed to places in Great Britain should not be re-directed to places overseas, as they are stopped under the provisions of Statutory Rules & Orders No. 1190 *of* 1940, *and No.* 359 *of* 1941

ANSWERS TO ENQUIRIES

By reason of staff shortage due to enlistment, we regret that it is no longer possible for us to answer enquiries involving research, or to supply dates when articles appeared in back numbers, either by telephone or by letter

TO CALLERS AND TELEPHONERS

Until further notice our office hours are:
Mondays to Fridays 9.30 *a.m. till* 5.0 *p.m.*
The office is closed on Saturdays

Unified Control of Production

THE recent three-day debate in the House of Commons on a motion of confidence in the Government, which was carried by 464 votes to 1, was marked in its final stages by an important pronouncement on the control of production. The Prime Minister, in the course of his reply to the debate, said that during his visit to America events had occurred which had powerfully affected the question of creating a Minister of Production. President Roosevelt had appointed Mr. Donald Nelson to supervise the whole of America's production and resources in the field of munitions and raw materials, and some similar office, with perhaps not the same but similar scope, would have to be created here if complete, smooth, and harmonious working between Great Britain and the United States was to be maintained on its very high level. It seems clear that the chief motive for the new policy in relation to production is the desire to make the working of the pooling arrangements between the two countries harmonious and complete, but Mr. Churchill also appears to have in mind the constructive case in favour of closer organisation at the top to secure increased efficiency in our own war effort. In the present phase of the war it is obvious that changes must be evolutionary rather than revolutionary. It is clear that whoever becomes Mr. Donald Nelson's counterpart in this country will be placed in a position of great authority in relation to the whole of British industry and much will necessarily depend on his own force of personality for the successful achievement of his task. We have previously pointed to the need for something in the nature of an Industrial General Staff, and we would stress again the obvious requirement that matters which vitally and intimately concern industry should be in the hands of a man who commands the confidence and respect of all the major classes of industry, and therefore, who must be of first class industrial experience.

Canadian Railway Securities Acquired by Treasury

By three Orders dated January 26 of this year the British Treasury is now on the point of acquiring the holdings of 45 sterling and dollar securities of the Canadian National Railways. On another page we give a list of these securities and their respective acquisition prices for each £100 nominal or $100 nominal. It will be remembered that by three Orders dated October 26, 1940, a substantial transfer to the British Treasury was effected of securities in which the Canadian National Railway Company is interested. One large sterling issue transferred by virtue of two of those Orders was the 4 per cent. perpetual consolidated debenture stock of the Grand Trunk Railway Company of Canada. The third Order of 1940 provided for the transfer of Canadian Railway issues payable solely or optionally in Canadian dollars. These included Canadian National Railway Company 4½ per cent. guaranteed gold bonds of 1951, 1956, and 1957; Canadian National (West Indies) Steamship Limited 5 per cent. guaranteed gold bonds 1955; and Canadian National Railway Company (successor by amalgamation to the Grand Trunk Pacific Railway Company) 4 per cent. sterling bonds 1962 and 3 per cent. first mortgage sterling gold bonds 1962.

Irish Railway Dividends

Pleasant surprises have come to the long-suffering stockholders of two prominent Irish railway companies. In the case of the Great Northern a dividend is being paid for the year 1941 of 1 per cent. on the ordinary stock, which is the first payment since ½ per cent. was distributed in respect of 1931. Even the 4 per cent. consolidated guaranteed stock had to go without a dividend for a time, as the dividend due on this stock for 1938 was not paid until April 1, 1941, and the arrears for 1939 and 1940 were cleared off on October 1 last. The consolidated 4 per cent. non-cumulative preference stock which had received nothing since March 1, 1932, also comes again into the dividend list. Belfast & County Down ordinary stockholders, who have received nothing since the 2 per cent. paid for 1925, are still to be without a dividend, but the 5 per cent. cumulative preference stock, on

which no payment had been made since that for the year 1925, is now to receive arrears for the three years 1926, 1927, and 1928. The 4½ per cent. "A" preference stock is in a curious position as, although non-cumulative, it ranks before the 5 per cent. stock to the extent that it is entitled to a dividend for any half-year in which there is a profit after providing for the proportion of prior charges attributable to that period. As there has been a profit for each second half-year since 1925, this stock has continued to receive 2¼ per cent., even though there has been no profit for any whole year since that time.

Overseas Railway Traffics

In the 29th and 30th weeks of the financial year five British-owned railway companies showed together a traffic increase of 1,467,900 pesos, as compared with 1,573,950 for the 27th and 28th weeks. The best showing is again made by the Buenos Ayres Great Southern with an advance of 740,000 pesos. Next comes the Buenos Ayres Western with a gain of 325,000 pesos, followed by the increase of 297,700 pesos on the Central Argentine. The Central Uruguay has not been doing so well lately, and its traffic decrease of £7,658 in the past two weeks has reduced its aggregate increase for the year to £53,528. For the 30 weeks of the financial year the United of Havana shows an advance of £123,204.

	No. of week	Weekly traffics	Inc. or decrease	Aggregate traffic	Inc. or decrease
Buenos Ayres & Pacific* ...	29th	1,550	—147	38,503	+3,370
Buenos Ayres Great Southern*...	30th	2,793	+352	68,812	+8,758
Buenos Ayres Western* ...	30th	969	+234	24,896	+4,216
Central Argentine*	30th	1,832	+172	52,727	+10,225
		£	£	£	£
Canadian Pacific	3rd	831,600	+176,400	2,306,600	+362,400

* Traffic returns in thousands of pesos

Aggregate gross earnings of the Canadian Pacific Railway for the whole year 1941 amounted to £44,289,200, an increase of £10,096,200 in comparison with 1940, and the aggregate net earnings of £9,191,600 showed an improvement of £2,063,800.

Surplus Stocks after the War

A special committee of the London Chamber of Commerce has issued a report on the disposal of Government surplus stocks after the war. Its main recommendations are that the stores should be used to create fresh markets, and that this objective should be the task of non-profit making commodity disposal companies. The importance of making plans for dealing with this matter will be readily apparent to all who recall the conditions that prevailed after the last war. Then large quantities of Government stores and equipment, to the value of many millions of pounds sterling, remained for disposal both in this country and overseas, and several years elapsed before they were finally liquidated. The value and volume of stores of this kind after the present war will be even greater. Those engaged in transport will remember the unhappy effects of the sale of great numbers of surplus army road vehicles; the resultant creation of numerous small independent road operators has left its legacy on the commercial road haulage industry to the present day. The committee of the London Chamber of Commerce recommends that surplus road making equipment and lorries, for example, should be presented, or sold at a nominal price, to undeveloped Crown Colonies and other countries where they would create a market for the motor and ancillary industries, instead of choking existing markets; stocks of other stores could be held to assist in maintaining the stability of the price structure.

The Influence of a High Speed Standard

Experience has often proved that the inauguration of special railway facilities, whether in the realm of speed or luxury, or a combination of both, has effects extending beyond the areas directly affected. Where railways are in direct competition, it is to be expected that each competitor will, from motives of self interest, provide equally good service, but it is the standard so set up that may lead other cities or areas, which regard themselves as neglected, to demand similar treatment. For some years past this has been the position on the Pacific coast of the United States. The city of Seattle, principal port at the northern end of the U.S.A. Pacific seaboard and the main focus of communication with Alaska, with its 400,000 inhabitants, has been looking enviously at the development of the streamline communications between Chicago and Los Angeles, San Francisco, and even its near neighbour Portland, while Seattle itself is left out in the cold. On a uniform schedule of 39¾ hr. the Santa Fe's Super-Chief and El Capitan both run twice weekly between Chicago and Los Angeles, and the Chicago & North Western-Union Pacific City of Los Angeles is running ten times monthly each way; similarly the City of San Francisco of the C. & N.W.-U.P.-Southern Pacific has a departure every third day in each direction and the same journey time. The City of Portland, another C. & N.W.-U.P. streamliner, takes 39¾ hr. on its five times monthly run, and Seattle business men wanting quick transit to or from the Middle West must take this train and travel *via* Portland—a 46 hr. journey involving change of trains—or fall back on the 58¾-hr. Empire Builder of the Burlington-Great Northern, or the 59 hr. Olympian of the Milwaukee Road—a grievance that in their judgment demands early redress.

Train Movement Curves

The time and running distance of a train under the influence of the many and varied forces applied to it are defined by the fundamental equation of the movement of the train. As a rule, analytical methods have been used for the computation of time-speed-distance curves in what are really the comparatively few cases (particularly on non-electrified lines) where these have been plotted as a preliminary to a comprehensive study of traffic working. Lomonossoff has given a good deal of attention to this subject, based on his investigations in Russia and the U.S.S.R., but the subject in pre-1914 years seems to have been one pursued almost wholly in Russia, principally by Lomonossoff himself, Lipetz, and Czeczott, later identified prominently with locomotive testing in Poland. Strahl and Dittner in Germany, Seefehlner in Austria, and Cain and Perkinson of the G.E.C. in America also have made notable contributions to the subject. Recently, A. I. Lipetz has published a simplified graphical method for plotting time-speed-distance curves for railway trains, which he evolved many years ago, and which he claims has been used with success in Europe, as well as in his own calculations as Consulting Engineer to the American Locomotive Company. More or less typical examples seem to indicate that this graphic method occupies only a quarter of the time taken by some of the existing analytical methods.

The Strength of Rolling Stock

It is a matter of surprise to many British railwaymen that apparently disastrous derailments and collisions on American railroads often result in so few casualties. In the head-on collision on the Western Pacific Railroad between the Exposition Flyer and a large freight engine running light, illustrated on p. 202, despite an impact which completely wrecked both locomotives, deaths were confined to two of the trainmen, and only ten passengers complained of injury. One of the products of the haphazard American operating methods of earlier days was an insistent demand by the American public for rolling stock of more massive construction, which in its turn produced by degrees the enormously heavy all-steel stock largely standard in North America today, often weighing up to 80 or 85 tons for a single 12-wheel car. The stout and well-designed construction of these vehicles, together with buckeye coupling and Pullman-type vestibules, has made telescoping of American cars in accidents a rare event, and although vehicles are thrown into various positions when derailed, they do not break up. In this connection it is significant that the

movement towards much lighter stock brought about, with the introduction of diesel streamline trains, by the use of light steel alloys, aluminium, welding, and in other ways, has already, like the swing of the pendulum, reversed its trend. The lightest stock so built came down in weight to round about 40 tons for vehicles 80 ft. long and over 10 ft. wide, but in the latest construction the tendency is to build stock weighing round about 60 tons a car—much lighter than previously, it is true, but with the strength of its construction in no degree below the previous standards.

Flameproof Locomotives

The construction of so-called flameproof locomotives has been given considerable impetus in the last two years by the requirements of munition factories and the like for tractors which will operate safely in explosive atmospheres. But what is a flameproof locomotive? Commonly a diesel locomotive is used, and though at one time there was a tendency to fit asbestos materials over bufferheads, couplings, brake blocks, and so on, the sparks arising at these points are neither hot enough nor of long enough duration to be of any danger. Properly flameproof equipment on the diesel locomotive is an expensive matter, and comprises protection to ancillary electrical equipment, as well as to the engine intake and exhaust systems and cylinder heads. Yet the diesel still remains the only self-contained tractor suitable for continuous duty which can be made flameproof. On the other hand there are further types quite suited to intermittent work, and two of these—the fireless and compressed air locomotives—are inherently more flameproof than a diesel. The third type, the electric battery locomotive, is probably on a par with the diesel as regards danger from flames or high-temperature sparks. For many years there has been a small but steady sale for fireless locomotives, principally for power stations, paper mills, biscuit factories and other similar industrial duties. But compressed air locomotives, with the exception of the passenger locomotives at the Paris exhibition about 40 years ago, have been limited almost entirely to work in mines or in the construction of tunnels.

Lateral Oscillation of Locomotives

Stability of the locomotive under varying track conditions is recognised as one of the objects of correct design and manufacture; some types and classes of engines are noteworthy for this desirable feature and others are not. The reasons for this are not in all cases easy to determine and may be the more obscure because the phenomenon may show itself in one or more particular instances among a large class built to the same drawings and in the same workshops. In this connection we have read with interest the contribution to the quarterly Technical Bulletin, edited and issued by the Director, Civil Engineering, Railway Board of India, and dated July, 1941, of Mr. S. Marchant, Assistant Transportation Superintendent, Great Indian Peninsula Railway, who in concluding his survey of "The Mechanics of the Reciprocating Steam Locomotive," stated that the analysis made so far shows that for all conditions a locomotive runs much easier when driving than it does when coasting, and this is borne out by actual running experience. A badly running engine, he says, has at times a most violent tendency to lateral oscillation when coasting, and one conclusion to be drawn is that such a locomotive with no front bogie may not necessarily have its riding qualities improved by the addition of a bogie unit. This is because if a bogie be added it has the effect of advancing the centre of friction relative to the centre of gravity and unless the control of the bogie is sufficiently powerful, the conditions that produce lateral oscillation may be increased. The tendency to lateral oscillation can be minimised by the provision of strong side control arrangement, but the need for this can be reduced by ensuring that the design has the rigid wheelbase set well back relative to the centre of gravity of the spring mass and that there is ample weight on the trailing end.

New Zealand Government Railways

FOR the New Zealand Government Railways the financial year ended March 31, 1941, was one of achievement surpassing even that of the previous year when traffic was stimulated by the Centennial Exhibition. The three abnormal factors of restriction in the use of petrol, increased output of primary and secondary industries, and transport of troops, combined in causing greater use to be made of the railway facilities during the year under review than ever before. The administration, besides working the railways, conducts a number of subsidiary businesses such as Lake Wakatipu steamers, road motor services, refreshment, bookstall, and advertising services, departmental dwellings, etc. These businesses produced in the year under review a gross revenue of £1,466,028, against £1,437,433 in the previous year, and made with the railway operating earnings, total gross earnings of £11,160,218, compared with £10,199,070 in 1939-40. Gross expenditure on all services was £9,465,574, or 84·82 per cent. of gross revenue, against £9,010,039 or 88·34 per cent. leaving net earnings of £1,694,644, which represented a return of 2·64 per cent. (against 1·96 per cent.) on capital. Interest charges at 4¼ per cent. were £2,746,544, leaving £1,051,900 excess of interest charges over net revenue, compared with £1,386,165 at the end of the previous year. Figures in the accompanying table refer to railway operations only :—

	1939-40	1940-41
Miles open	3,390	3,390
Train-miles	13,366,798	13,559,646
Passengers, ordinary	8,283,067	9,440,087
Goods tonnage	7,077,298	7,754,768
Operating ratio, per cent.	90·66	86·72
	£	£
Passenger receipts	2,119,335	2,345,718
Goods traffic receipts	6,109,293	6,818,603
Operating earnings	8,761,637	9,694,190
Operating expenses	7,943,120	8,406,790
Net earnings	818,517	1,287,400

The train passenger revenue of £2,345,718 was the highest amount collected in any year since 1926 (the year of the Dunedin Exhibition). An important factor in the general goods increase was the augmented amount from New Zealand industries, particularly in coal, manure, lime, and products of agriculture. Net ton-miles covered in the transport of goods and livestock were also the greatest in the annals of the railways, and reached 659,724,000, an increase of 13·59 per cent. over 1939-40. The higher expenditure was due primarily to the increased cost of handling the heavier passenger and freight traffic, and to the payment of the cost of living allowance granted to members of the lower grades. Electrification of the Wellington-Paekakariki route (27 miles), which was completed and brought into use in July, 1940, has met with satisfactory patronage. Gross revenue from the refreshment services, including the sleeping car facilities in both Islands, amounted to £221,424, an increase of £20,553. Net revenue from road services was £31,846, an advance of £22,586, or no less than 243·91 per cent.

The Orient Express

ONE of the most famous and certainly the oldest established of the great international trains on the European Continent is the Orient Express, and it is not too much to say that this train has played a preponderating part in the development of European international services. It was established by the International Sleeping Car Company and ran for the first time, between Paris (Est) and Vienna, on June 5, 1883. From the beginning it was composed of bogie sleeping cars, vans belonging to the company, and a six-wheel dining car; the last-named was soon replaced by bogie stock. Before the connection of the Serbian and Bulgarian railways with the main European system, this train ran to Bucharest and on to Varna on the Black Sea, enabling the last stage of the journey to Constantinople (now Istanbul) to be made by boat. With the completion of railway links enabling a through train to be established between Paris and Istanbul, this train connected Paris, Vienna, and Budapest with all the Balkan capitals by reason of the fact that it was divided at Budapest, one portion proceeding on the original route and the other *via* Belgrade, Nish, and Sofia, to Istanbul.

Not until the beginning of the present century was a similar train introduced from Berlin; but on June 1, 1901,

under the name of *Balkanzug*, a through train was inaugurated from Berlin to Budapest, the coaches of which were linked up with those of the main train from Paris as well as a through coach from Ostend (introduced on June 1, 1894) which ran *via* Brussels, Cologne, and Frankfort, and was attached at Wels. The war of 1914-19 naturally resulted in the suspension of the Orient Express, and during the war period Germany established its famous Berlin-Istanbul through train in white livery. As soon as the Armistice was signed the Orient Express was re-established as a military train running three times a week between Paris and Vienna, and on to Warsaw, but passing to the south of then German territory, following the route of the Arlberg-Orient Express through Paris to Basle and Linz, and then through Vienna and Oderberg. At first it stopped in Vienna at both the West and Nord Stations, but the call at the former was abandoned in 1920.

In due course the original Orient Express resumed its original route, but meanwhile the Simplon-Orient Express had been established with the object of providing a political link between Western Europe and the Balkans without touching Central Europe territory. To this end it ran from Calais *via* Paris, Lausanne, Milan, Venice, Trieste, and Zagreb, to Vinkovci. At the last-named point it divided and one portion proceeded to Bucharest; the other portion went *via* Belgrade and Nish to Sofia and Istanbul on the old Orient route, while a Greek portion, established in July, 1920, was detached at Nish and continued its journey to Athens *via* Salonica. The other post-war train to the Orient is the Arlberg-Orient Express which was begun in 1924 as a sleeping-car train between Paris and Vienna running through Basle, Sargans and Salzburg, and joining the original Orient Express route at Wels. It soon had a through coach for Bucharest and its timing was brought into line with those of the other main trains to the East. The complete ramifications of these Orient Expresses make a fascinating study, and for the benefit of those who desire to follow them in detail the late Professor Lionel Wiener described them at length in an article which he contributed to the monthly *Bulletin of the International Railway Congress Association*, and which was published in the July, 1934, English edition. Since that time the route of the Bucharest section of the Simplon-Orient Express has been modified as a result of the opening of the new Danube bridge to the north of Belgrade in November, 1935. The former Vinkovci—Bogojevo—Subotica route was abandoned in 1939, and the train diverted to the new Belgrade—Pancevo line. Incidentally, the six-span steel bridge crossing the Danube between Erdut and Bogojevo, on the older route, was blown up by Jugoslav Forces in April, 1941, and is still out of service (see page 595 of our December 5 issue).

In the days of crisis before the outbreak of the present war, the Simplon-Orient Express was curtailed in the west, and the train then ran from August 30, 1939, between Istanbul and Milan. This lasted for little more than a week, however, for the decision was taken very quickly to extend the service through to Paris; the first departure from Paris was on September 7, and the first arrival there on September 9, 1939. Thereafter Paris remained the western terminus until the days immediately before the Italian declaration of war on Great Britain and France. Actually it was from May 27, 1940, that the Simplon-Orient Express was curtailed once more to run only between Istanbul and other Balkan points and Milan. In this form it continued to be maintained regularly with stock of the International Sleeping Car Company until nearly the end of February, 1941. Then, at the time of acute Axis pressure on Bulgaria, the Nish-Istanbul section was suspended, as frontier traffic between Jugoslavia and Bulgaria was confined to local trains upon which passengers were subjected to rigid inspection. Through traffic between Bulgaria, Greece, and Turkey ceased on March 13. This left the Italian and Jugoslav sections as the last remainder of the Simplon-Orient Express, and for practical purposes this famous train may be regarded as having been abandoned during the continuance of hostilities. The German invasion of Jugoslavia and Greece on April 6 last, destroyed any further possibility of international train services in the accepted sense, as thereafter the main land mass of Europe with standard-gauge railways came under German occupation or influence, and through traffic virtually ceased to exist excepting so far as it served German needs. It appears that recently various trains, covering broadly the field of the Orient Expresses, have been introduced under German auspices. These include the following runs: Berlin—Salonika, 60 hr.; Paris—Bucharest, 56 hr.; Cologne—Bucharest, 48 hr.; and Berlin—Sofia, 36 hr. All these now have Mitropa sleeping cars.

Railway Transport and the Tempo of War

SOME critics of British railway administration have fastened upon the occasional need to curtail passenger train facilities in order to make way for additional goods and coal traffic, as signs of railway administrative inefficiency, and of a tendency to surrender to obstacles which merely exist to be overcome. It is naturally the ambition of the British main-line railway companies to convey all persons who wish to travel, and every ton of merchandise which is offered, but the plain facts are that in wartime essential traffic must have priority, and that at times the capacity of the railways is taxed to an extent which makes it impossible to satisfy all needs. An interesting point brought out by the *L.N.E.R. Magazine*, and which is apt to be overlooked, is that of the vast difference in tempo between the war of 1914-1919 and the present one. It has to be remembered that the last war developed gradually and, apart from a few diversions such as the Gallipoli adventure, settled down to a contest of endurance on the Western Front. This war is being fought at a tremendous pace, and, ramifying into many distant regions, has made unprecedented demands on transport of all forms. At home the transfer of shipping from its accustomed channels and the complete stoppage of trade with many countries which remained neutral from 1914 to 1919 have thrown a heavy burden on the railways. Despite declining revenues, a great deal has been done since the amalgamation of 1923 to improve operating facilities, but necessarily new works and appliances were designed to deal with the normal flow of traffic in peacetime. During the emergency many of these improvements lie fallow, while fresh demands, which could not have been foreseen, are made upon our resources. These calls come at a time when stocks of materials and the supply of labour have alike to be conserved cautiously. Yet much is being done and if anyone who is sceptical about the contribution of the railways to the war effort will only keep his eyes open as he travels about the country he will see that unobtrusively a large programme of new construction is on the way. Already loop lines have been built at many places, and marshalling yards have been extended or constructed on new sites to deal with traffic which did not exist before the war.

South African Railways & Harbours

DURING the year ended March 31, 1940, traffic and revenue figures were, according to the report received from Mr. C. M. Hoffe, the General Manager, even higher than those of the preceding year in which many new traffic and revenue records were established. General working results achieved during the year under review afforded reasonable cause for gratification. The volume of goods traffic offering was without parallel in the history of the South African Railways, and coal traffic was particularly heavy. The passenger traffic position was undoubtedly influenced by the number of soldiers and other defence units moving, but ordinary passenger traffic was also considerably in excess of that of previous years and was extraordinarily heavy during the winter and summer excursion periods. Revenue from the combined services of railways, harbours, steamships, and airways was £43,707,539, an increase of £4,010,905 in comparison with the previous year, and total working expenditure on all services, including depreciation and interest on capital, amounted to £37,652,583, an advance of £1,724,309. Net revenue appropriations take £2,887,000, leaving a surplus balance for the year of £3,167,956. Adding surplus balance of £1,563,463 brought forward makes a total surplus of £4,731,419, from which a special appropriation of

£1,500,000 is made, leaving a surplus of £3,231,419 to be carried forward.

Compared with 1939-40, earnings from transportation services increased by £2,647,539, or 7·83 per cent., and gross working expenditure by £336,672, or 1·35 per cent. Suburban passenger traffic revenue aggregated £1,761,723, representing an increase of £208,564, and main and branch line bookings realised £5,237,119, an improvement of £725,504. Parcels brought in £696,078, or £37,999 more than in the previous year. Earnings from goods were higher by £1,120,163, or 5·27 per cent., and coal receipts were better by £352,164, or 9·23 per cent. Livestock earnings improved by £108,788, or 13·03 per cent. Working expenditure, exclusive of £2,456,616 depreciation, represented 62·82 per cent. of gross earnings. The principal changes in operating expenses were increases of £233,363, or 6·66 per cent., in maintenance of way and works, and £168,445, or 2·54 per cent., in running expenses. Maintenance of rolling stock expenses, on the other hand, were reduced by £153,604, or 3·30 per cent. Figures in the accompanying table refer to railway operations only.

	1939-40	1940-41
Route-miles open	13,288	13,291
Train-miles	62,307,697	64,597,919
Passenger journeys	120,282,087	126,307,610
Goods and minerals, tons	22,172,588	22,293,614
Coal traffic, tons	10,086,495	10,825,698
Ton-miles (revenue earning) ...	7,482,067,576	7,944,422,065
Average haul, miles	229	237
Operating ratio, per cent.	74·01	69·56
Percentage return on capital ...	£5 5s. 7d.	£6 6s. 6d.
	£	£
Passenger receipts	6,064,774	6,993,842
Goods and mineral receipts	21,253,148	22,373,311
Coal traffic receipts	3,814,284	4,166,448
Total earnings	33,797,661	36,445,200
Working expenditure	22,625,324	22,895,012
Gross working expenditure (including depreciation)	25,014,956	25,351,628
Surplus over expenditure	8,782,705	11,093,572
Surplus over interest, etc.	3,692,773	5,581,688
Capital expenditure (open lines) ...	167,756,895	170,606,878

The loss on working the South-West Africa Railways was £221,597. The new line of railway between Germiston and Jupiter was completed during the year under review and opened for traffic on December 2, 1940. Doubling of the section Jupiter-Booysens, including the work of remodelling Jupiter station, was completed during the year and the new line opened to traffic on June 16, 1940. Good progress was made with the quadrupling of the track between Langlaagte and Vereeniging. During the year 241 miles 34 chains of track were totally relaid, 272 miles 37 chains were resleeped, and 233 miles 75 chains were re-railed. In view of the difficulties experienced in obtaining material and equipment from overseas, it was decided early in 1940-41 that work on the electrification of the old Natal main line between Rossburgh and Hillcrest should be suspended, with the exception of the erection of certain sub-station buildings. Total route mileage of road services rose from 16,319 to 16,950, and the revenue of £869,697 from their operation showed an increase of £65,004, but the steep rise in expenditure caused an operating loss of £46,788.

PUBLICATIONS RECEIVED

The Advocate Annual, 1941, published by Burnie & Devonport, of Tasmania, contains excellent illustrations of the varied scenery and diverse activities of the island. The Tasmanian Government Tourist Bureau arranges tours and observation cars and fast trains are features of rail services; modern motor coaches give comfortable travel on good roads; air liners and luxury steamers provide speedy travel from overseas. Modern factories at Burnie and Boyer convert Tasmanian hardwood forests into high-quality newsprint; the ultimate output of Boyer will be 108,000 tons a year, sufficient to meet the present Australian rationed consumption.

Percival Marshall & Co. Ltd.—This company, which is associated with the Electrical Press Limited, has announced its policy for the control of book production in the national interest. Shortage of paper and scarcity of labour, coupled with a rising demand, limit the range of books which this publishing house can produce. It has accordingly elected to choose subjects according to their importance in relation to the war effort. Model engineering enthusiasts are advised that their hobby books may not be purchasable for the time being, as the issue has been restricted in order to maintain the supply of workshop handbooks which provide technical instruction for lathe-operators, toolmakers, electricians, and so forth, which is essential to the manufacture of munitions. The address of Percival Marshall & Co. Ltd. is Cordwallis Works, Maidenhead, Berks.

The Little Less.—Under this title, His Majesty's Stationery Office, on behalf of the Ministry of Information, has recently issued a booklet which indicates methods by which every one can help the war effort by saving. The method does not necessarily mean that of foregoing cigarettes, chocolates, or any other luxury (always supposing one can get them), but rather in the small way of saving string, re-using paper, using less water in the bath, and turning down the gas. With every suggestion, which is on the system of one thing leading to another, there is added a column of "Data for the Doubtful." In the example of less water in the bath and turning down the gas we are informed that there are 12,000,000 gas users in the country. If every one saved a little gas daily by the method suggested, it would amount annually to the filling of 14,000 large gas-holders. To fill this number ordinarily it takes 2,500,000 tons of coal, which is enough to fill a goods train 500 miles long. To quote the book, "not only would more coal be available for national use, but our railways would have 5,700 trains set free for more essential war transport." The "Data for the Doubtful" then tell us of the number of cubic feet of gas in a holder, the cubic feet obtained from a ton of coal, the length of a railway truck, the capacity of the truck, and the number of trucks to a train. Heading this column is our old friend, Mr. Therm, gaily blowing a whistle, while he clasps a railwayman's lantern in one hand and a flag in the other. The book costs 6d. and has 48 pages, the text is compiled by Guy Reed, and the drawings are by Fougasse. Both author and artist have given their services free in the making of it. It is a lighthearted handling of a dark subject, but every one can find something in it for himself, and some suggestion of what he can do in the national war effort.

No specimens are known to have survived of the rolling stock used on the Surrey Iron Railway, the first public railway in the world, which was incorporated by an Act of 1801, *and opened in* 1803. *The line extended from the Thames at Wandsworth to Croydon, and was used exclusively for goods. In the Hull Railway Museum a full-sized reconstruction of flangeless wheel wagons, as used on the Surrey Iron Railway, was on exhibit until its destruction by fire as the result of enemy action. The illustration reproduced alongside (taken by courtesy from the catalogue of the Hull Railway Museum) is of an artist's impression of wagons on the Surrey Iron Railway. We are indebted to Mr. J. B. Fay, Assistant Director of the Hull Municipal Museums, for informing us that, although all the museum records with regard to the acquisition of this wagon were lost during an air raid, his recollection is that the Hull Railway Museum purchased the wagon for* £5. *No details are known as to the date it was made. The wheels, axles, and so forth, survived the fire, and it is hoped to build them into a new model*

THE SCRAP HEAP

C.N.R. BRONZE CLOCK FOR SCRAP

One of Toronto's best landmarks, the great four-sided bronze-faced clock on the Canadian National Railways booking office at the corner of King and Yonge Streets has been removed, and its quarter-of-a-ton of bronze melted down for war purposes.

* * *

RAIL CLERK WAS THEATRE OWNER

Mr. John Herbert Jay, formerly London School Board and railway company clerk, who became a London theatre owner, has died at Hove, after an illness of only a few days. He was 70. Mr. Jay's first business association with the stage was as first lessee and manager of the Royal Victoria Theatre, Ramsgate. In 1913 he built the Ambassador's Theatre, and remained managing director until his death. Mr. Jay started management in London for himself in 1915, and at the Criterion, with Anthony Ellis, produced "A Little Bit of Fluff," which ran for nearly three years.—*From "The Star."*

* * *

I had occasion lately to go from Cirencester to London. On the score of economy I chose to travel by the second-class carriage. The day being somewhat cold, I took care to be at the station in ample time to secure a seat in the carriage where I should be the best protected from the cutting wind. . . . I spoke to the person in the office who was standing by and requested that he would open the door of the department I pointed out to him. He requested to know where I was going, and on being informed, opened the door of another department where the current of air from each side would necessarily meet, in fact the most exposed place in the carriage, observing that it was the position allotted to all London passengers.—*From "The Times" of December* 29, 1841.

* * *

THE POWER OF THE PRESS

Thousands of letter-copying presses—once an essential feature of all offices—are lying neglected in offices all over the country, and may never be used again. The iron and brass of which they are made are needed for guns and tanks. The Supply & Recovery Board urges all owners of these old-fashioned presses to give them up as scrap.—*From "The Evening News."*

* * *

Although Costa Rica is somewhat backward in the construction of railroads, it is interesting to note that Richard Trevithick, who disputes with Stephenson the honour of having invented the locomotive, was in that country during the years 1822 to 1827, and that he proposed the construction of a railway from the limit of navigation of the River Sarapiqui to the capital and from there to the mines of Aguacate and Machuca. If the project had been carried out at that time, Costa Rica would have had the distinction of being the first field of trial of an invention that has transformed the economic and social conditions of the world. — *From U.S.A. Department of Commerce Trade Promotion Series No.* 5.

* * *

G.W.R. "DIPLOMAT"

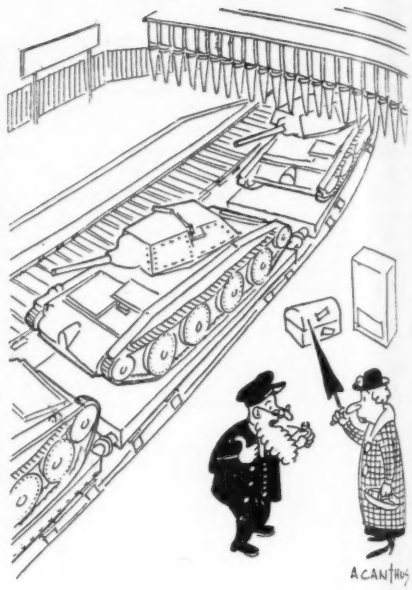
The G.W.R. "ambassador" to the London markets, Mr. E. W. Impey, of Kingston Road, Southall, has just completed 50 years as a railway employee. His job is to ensure smooth relations between the railway and the men of the markets. He is 64 and joined the G.W.R. as a "slipper boy"—unhooking chains—at Swindon.—*From "The Evening News."*

* * *

"AUTRES TEMPS, AUTRES MŒURS"

We got to Waterloo at eleven, and asked where the eleven-five started from. Of course nobody knew; nobody at Waterloo ever does know where a train is going to start from, or where a train when it does start is going to, or anything about it. The porter who took our things thought it would go from number two platform, while another porter, with whom he discussed the question, had heard a rumour that it would go from number one. The station-master, on the other hand, was convinced it would start from the local.

To put an end to the matter, we went upstairs, and asked the traffic superintendent, and he told us that he had just met a man who said he had seen it at number three platform. We went to number three platform, but the authorities there said that they rather thought that train was the Southampton express, or else the Windsor loop. But they were sure it wasn't the Kingston train, though why they were sure it wasn't they couldn't say. Then our porter said he thought that must be it on the high-level platform; said he thought he knew the train. So we went to the high-level platform and saw the engine driver, and asked him if he was going to Kingston. He said he couldn't say for certain, of course, but that he rather thought he was. Anyhow, if he wasn't the 11.5 for Kingston, he said he was pretty



"Moscow only, Lady. Stow-on-the-Wold next train."

[*Reproduced by permission of the proprietors of "Punch"*

confident he was the 9.32 for Virginia Water, or the 10 a.m. express for the Isle of Wight, or somewhere in that direction, and we should all know when we got there. We slipped half-a-crown into his hand, and begged him to be the 11.5 for Kingston. "Nobody will ever know on this line," we said, "what you are, or where you're going. You know the way; you slip off quietly and go to Kingston." "Well, I don't know, gents," replied the noble fellow, "but I suppose *some* train's got to go to Kingston; and I'll do it. Gimme the half-crown." Thus we got to Kingston by the London & South Western Railway.

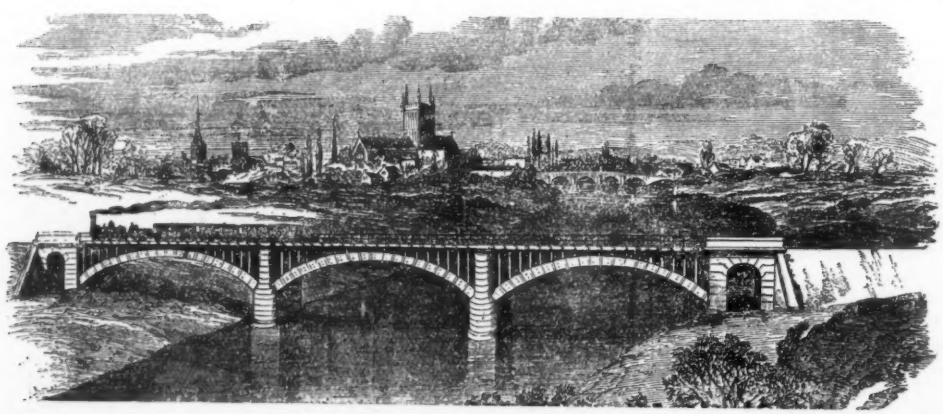
We learnt, afterwards, that the train we had come by was really the Exeter mail, and that they had spent hours at Waterloo looking for it, and nobody knew what had become of it.—*From "Three Men in a Boat," by Jerome K. Jerome.*

* * *

TESTING STEEL RAILS

An extract from "The Fact Book" which has been kept by the Divisional Engineer, Plymouth, G.W.R., and his predecessors for nearly a century.

G.W.R. test	18 cwt. falling 6 ft. 3 times
B. & E.R. test	1 ton " 10 ft.



Left: Reproduction of a woodcut from "The Illustrated London News," of December 17, 1853, *showing the iron railway bridge over the river Wye at Hereford. A navvies' dinner ticket in connection with the formal inauguration of this section of line on December* 6, 1853, *was reproduced at page* 46 *of our January* 9 *issue*

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

SOUTH AFRICA

Union Harbour Conference

A conference was held recently in Pretoria to devise means to speed up the clearance of cargo and ships in the Union harbours. Other matters discussed were improvements in fuelling of ships, the protection of harbours, and an increase in their working capacity. The delegates to the conference represented the railways and harbours administration, harbour advisory boards, internal security, industrial manpower, Department of Defence, Department of Commerce & Industries, Department of Customs, Immigration, British Ministry of War Transport, Royal Navy, Association of Chambers of Commerce, stevedoring companies, fuelling companies, shipping agents and forwarding and clearing agencies.

At the close of the conference the Minister of Railways & Harbours—Mr. F. C. Sturrock—expressed himself as well satisfied with the results achieved. The conference, he said, had been an experiment, but the result had exceeded expectations. The co-operation of the commercial community had been willingly promised in the general effort to bring about improvements. The rival claims of Durban, Capetown, and Port Elizabeth had not once been brought forward at the conference. All delegates were brought face to face with the realisation of their mutual problem. The most striking feature of the conference, declared the Minister, was the expressed desire of the various interests represented to co-operate in making the most effective use of harbour areas.

First Railway in South Africa

A portion of the first railway line in South Africa has been discovered in Durban Station by workmen engaged in constructing a new platform. The rails were of the British standard gauge of 4 ft. 8½ in. and were originally laid by the Natal Railway Company in 1860 and formed part of the line from Durban to Point. They were found below about a foot of soil and, despite the length of time they have been buried, are in good condition. The portion of the line appears to have been buried when the level of the station yard was raised and the present line of 3 ft. 6 in. gauge laid down.

UNITED STATES

New York-Miami in 24 hr.

A long-sought objective of the south-eastern railroads has this winter been attained, despite the demands of the defence programme. It was to cut the fastest journey time between New York and the Floridan coast resort of Miami to the even 24 hr., and this became effective from the middle of December. The trains concerned are the Orange Blossom Special of the Seaboard Air Line and the Havana Special of the Atlantic Coast & Florida East Coast Railroad—both diesel hauled south of Washington (including the short main line of the Richmond, Fredericksburg & Potomac RR., used by both companies between Washington and Richmond)—and the electric haulage of the Pennsylvania RR. between New York and Washington.

The Seaboard Air route is 1,367·5 miles in length, and the Atlantic Coast route is 1,327·9 miles, so that the overall average speeds of the two streamliners are 57 and 55·3 m.p.h. respectively; the cut below last winter's times is 2½ hr. In the interim, however, the Silver Meteor of the Seaboard and the Champion of the Atlantic Coast—both originally streamlined "all-coach" diesel flyers, but now incorporating Pullman sleepers also in their formations—were brought down to 24½-hr. schedules (now increased, with extra stops, to 25 hr.), so that the final acceleration needed for the reduction to the 24-hr. level has been one of only 30 min. Other expresses between New York and Miami have been speeded up by 2 to 3 hr.

Southern Pacific Streamliners

Such has been the success of the Daylight streamline trains operating twice daily in each direction over the 470 miles of the coast route between San Francisco and Los Angeles on 9½ hr. schedules, that during the past year the Southern Pacific has greatly extended its streamline operations. New streamline stock has been introduced on the Lark, an all-Pullman night service over the same route; each set of cars includes eight sleepers, and a triplet articulated lounge-diner-kitchen set. A section of the train, known as the Oakland Lark, joins and leaves the main train at San Jose. The Lark takes 12 hr. between San Francisco and Los Angeles. Two 14-car streamline sets have also been built for the San Joaquin Daylight, which runs daily over the inland route between San Francisco and Los Angeles *via* Bakersfield and Merced! These trains are worked by the latest Southern Pacific semi-streamlined 4-8-4 locomotives.

New Stock for Overland and Golden State Limiteds

The Southern Pacific is also interested in new streamline stock which is now being built for the Overland Limited and the Golden State Limited. The former is an all-Pullman daily train over the same route as the bi-weekly 39¾ hr. streamliner City of San Francisco, taking 60 hr. westbound and 58 hr. eastbound for the journey of 2,260 miles, and requiring six trains of 84 cars in all, which are being built to the joint order of the Southern Pacific, Union Pacific, and Chicago & North Western Companies. The Golden State Limited runs between Chicago and Los Angeles by the Rock Island & Pacific route, *via* Kansas City, serving the well-known winter resorts of Arizona, such as Tucson and Phœnix. For this service three trains are being built jointly for the Southern Pacific and Rock Island companies, with a total of 28 cars. In addition to the foregoing, the Missouri Pacific RR. is building two 7-car streamline diesel trains to work between St. Louis and Denver, the service to be known as the Colorado Eagle.

Road-Rail Service on the Rio Grande

A new facility has recently been instituted by the Denver & Rio Grande Western RR., in which road trailers are loaded on to special flat wagons for conveyance over the railway; the cars were reconstructed from old motor wagons, and have been fitted with passenger brake equipment so that they may be worked in passenger trains. Service is offered over the heavily-graded 450 miles of the main line between Denver, Pueblo, Salida, and Grand Junction, which includes the 10,240 ft. altitude of Tennessee pass, and whereas the all-road trip between these points takes 18 hr., the railway performs the same task at less cost in 15 hr. The trailers belong both to Rio Grande Motorways, a D. & R.G.W.RR. subsidiary, and also to private owners. This co-ordinated road and rail service is likely to be extended elsewhere.

Poppet-Valve Locomotives

The Franklin system of steam distribution, including poppet-valves, which, as described at page 355 of the October 10, 1941, issue of THE RAILWAY GAZETTE, has proved so successful on "K4s" Pacific No. 5399 of the Pennsylvania Railroad, is to be tried by two other lines. The Chicago, Burlington & Quincy is applying it to a large 4-8-4 locomotive, and the Missouri Pacific is rebuilding a 3-cylinder Pacific as a 2-cylinder poppet-valve engine on the Franklin system.

DENMARK

State Railways' Results in 1940-41

The financial results of the Danish State Railways for the year ended March 31, 1941, show an increase in the deficit to Kr. 24,600,000, or about 30 per cent. more than a year before, w en it amounted to Kr. 18,300,000. Operating receipts rose to Kr. 187,000,000, 34 per cent. more than the Kr. 139,500,000 in the preceding financial year. Operating expenditure rose by 17½ per cent. from Kr. 135,500,000 to Kr. 159,000,000. Heavy wear and tear on rolling stock and permanent way—brought about by the considerably increased traffic—necessitated a larger allowance for depreciation amounting to no less than Kr. 36,700,000 (including Kr. 15,900,000 for extraordinary depreciation) as against Kr. 7,300,000 a year ago.

The increase in goods traffic was due mainly to (1) the restriction of road traffic, brought about by the shortage of motor fuel and tyres, (2) the drastic restriction of coastal shipping as a result of British surveillance and also of shortage of motor fuel, and (3) to the increasing interchange of goods with Germany in which railway traffic is instrumental.

Foreign Trade with Germany

It must be borne in mind, in this connection, that 80 per cent. of Denmark's foreign trade is with Germany at the present time, according to a statement recently by the Danish Minister of Trade. Consequently, the State Railways' goods receipts for the year under review show an increase of 45 per cent. as compared with those for the preceding financial year, when they amounted to Kr. 54,500,000, including livestock. The volume of goods conveyed during the financial year 1940-41 was 1,800,000 *tonnes* higher than in 1939-40, and is given as 767,000,000 *tonnes*, a figure which must be considered with due reserve. The commodities mainly responsible for the increase of traffic were coal and other fuels in the home and import traffic, and food stuffs in the export traffic.

Passengers Fewer; Receipts Higher

On the other hand, the number of passengers conveyed dropped by 17 per cent. from 53,500,000 to 44,500,000, although, thanks to the increase of fares, passenger receipts at Kr. 75,800,000 were about 7·3 per cent. higher than in the preceding financial year, when they were Kr. 70,700,000.

The main causes of the increase of the expenditure were higher prices for coal, lubricants, electric current, and higher wages; the personnel numbered 21,350 on March 31, 1941, the same as a year previously. It is pointed out that the route-length of the Danish Railways' bus system totalled 2,754 km. (1,710·2 miles) on March 31, 1941; that of the railway system was 2,391 km. (1,486 miles).

G.W.R. BUFFET CARS

WE reproduce herewith drawings of three types of buffet cars which have been in service on the G.W.R. The first drawing is of the most generally used type, which provides 8 stand-up seats with back-rests at the counter, and 21 seats in the open saloon, where tables are provided. This vehicle is carried on six-wheel bogies.

The second type illustrated was built specially for the Bristolian, and is on four-wheel bogies. As will be seen from the drawing it has 12 stand-up rest seats at the counter.

The third is the type which has 8 stand-up rest seats at the counter, but in present circumstances does not provide seating accommodation for buffet passengers because the three ordinary compartments in the coach are always full. This also is a four-wheel bogie vehicle.

At the present time the G.W.R. has three buffet cars in service and also two restaurant cars which are used as buffet cars. Particulars of these services are as shown below :—

BUFFET SERVICES

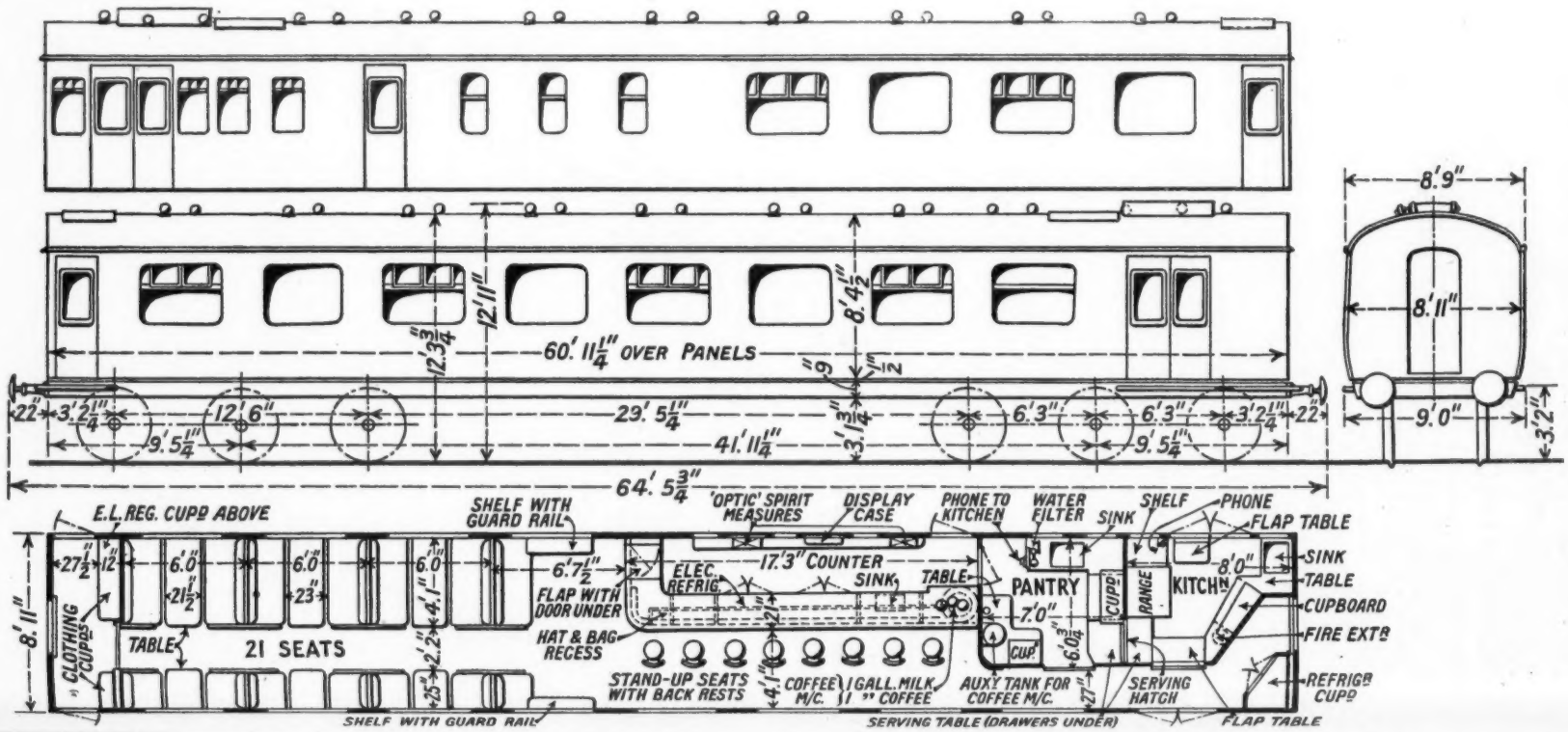
9. 5 a.m. Paddington to Bristol.
4. 0 p.m. Bristol to Paddington (Saturdays excepted).
1.45 p.m. „ „ (Saturdays only).

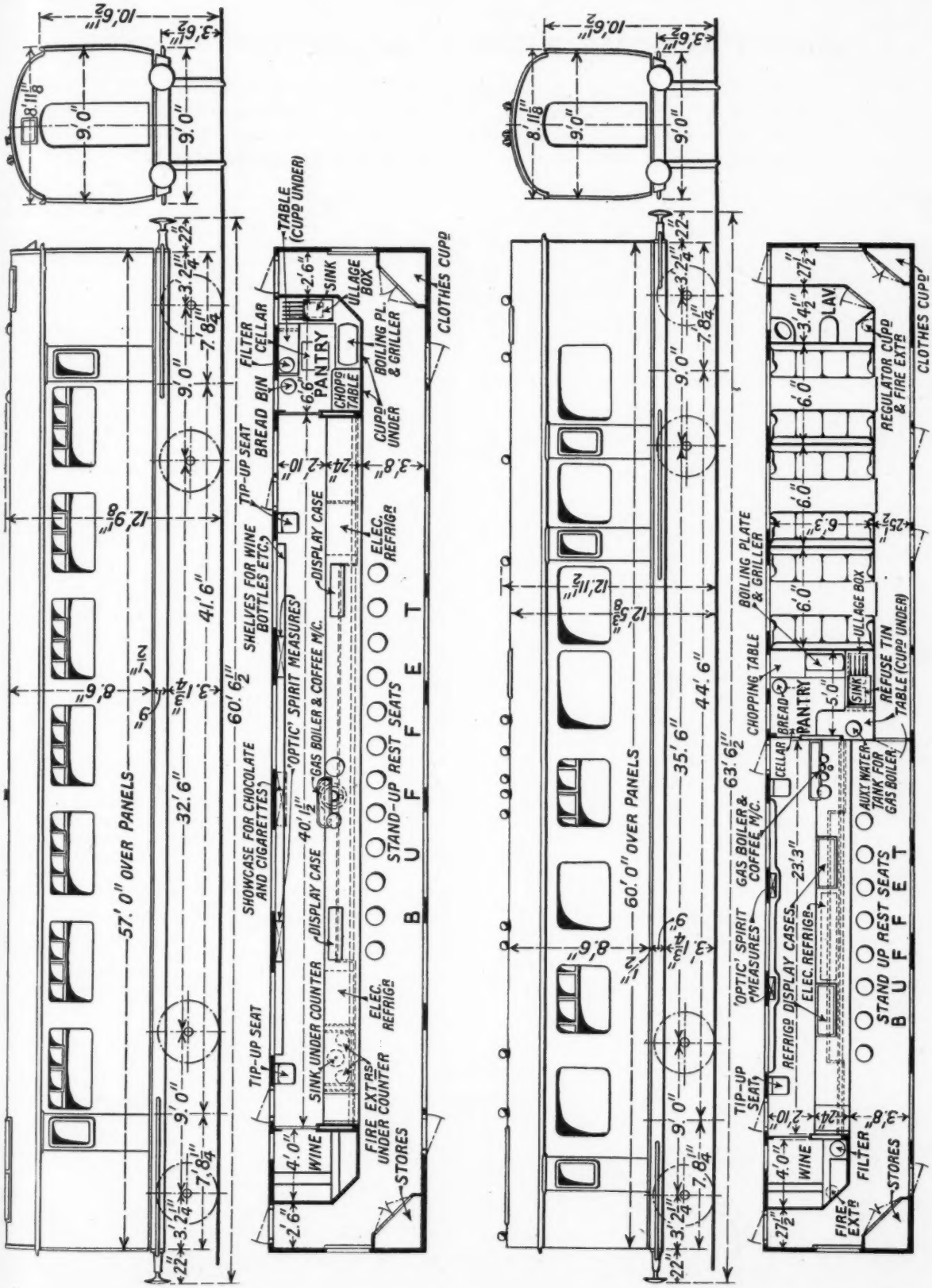
9.15 a.m. Paddington to Weston-super-Mare.
4.35 p.m. Weston-super-Mare to Paddington.

8.45 a.m. Weymouth to Paddington.
6. 0 p.m. Paddington to Weymouth.

RESTAURANT CARS USED AS BUFFET CARS

8.15 a.m. Cardiff to Paddington.
6.35 p.m. Weston-super-Mare to Paddington.



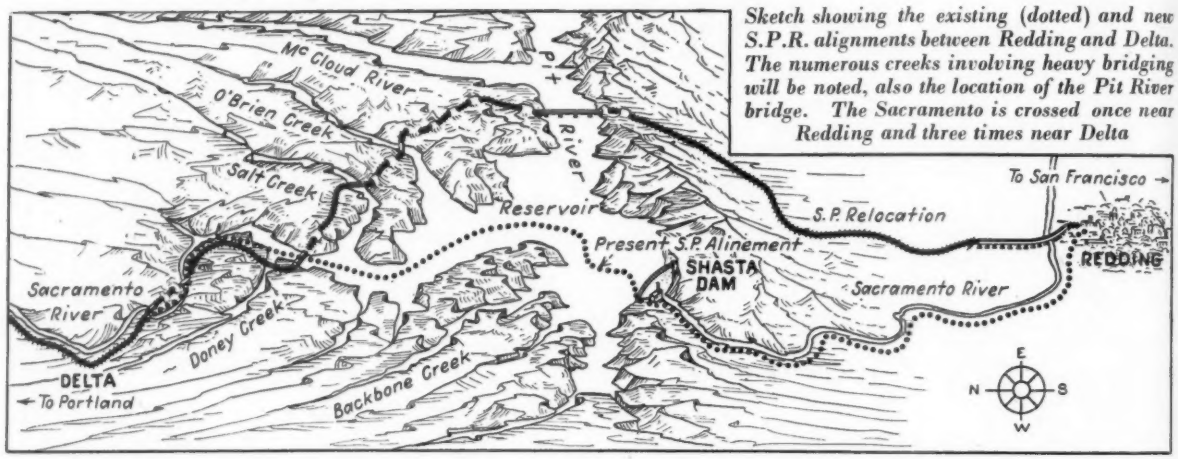

B U F F E T
STAND-UP REST SEATS
PANTRY
SINK
LAV
WINE
FILTER
STORES
FIRE EXTR
TIP-UP SEAT
SHELVES FOR WINE BOTTLES ETC.
SHOWCASE FOR CHOCOLATE AND CIGARETTES
'OPTIC' SPIRIT MEASURES
GAS BOILER & COFFEE M/C.
DISPLAY CASE
ELEC. REFRIGR
SINK UNDER COUNTER
FIRE EXTRS UNDER COUNTER
FILTER CELLAR
BREAD BIN
TABLE (CUPD UNDER)
VILLAGE BOX
BOILING PL. & GRILLER
CHOPG TABLE
CUPD UNDER
CLOTHES CUPD
CHOPPING TABLE
BOILING PLATE & GRILLER
CELLAR
BREAD
AUXY WATER TANK FOR GAS BOILER
REFUSE TIN TABLE (CUPD UNDER)
REGULATOR CUPD & FIRE EXTR
REFRIGD DISPLAY CASES
ELEC. REFRIGR
57'0" OVER PANELS
60'0" OVER PANELS
60'6½"
63'6½"
41'6"
44'6"
32'6"
35'6"
12'9⅝"
12'11½"
9'0"
8'6"
3'1¼"
3'6½"
10'6½"
8'11⅛"
7'8¼"
3'2¼"
22"
24"
2'10"
3'8"
4'0"
2'6"
6'6"
6'0"
5'0"
3'4½"
27½"
25"

MODERN AMERICAN RAILWAY CONSTRUCTION METHODS

The construction of the Southern Pacific main line diversion round the Shasta dam reservoir involved special measures to insure stable formation and reduce initial maintenance. Unusually careful measures were also taken to provide against earthquake damage

THE re-alignment of the Southern Pacific Railroad main line round, instead of through, that part of the Sacramento river valley which will be converted into a great lake by the building of the Shasta dam, was briefly described in our issues of July 22, 1938 (p. 154), and November 10, 1939 (p. 603). The work is being done by the Federal Bureau of Reclamation of the Department of the Interior, which is sparing no pains to construct the most water-tight and stable embankments and free-draining stable cuttings that modern scientific methods can insure.

To achieve these results with the 5,500,000 cu. yd. of excavation in cut-and-fill construction that were necessary in this rough mountainous country, a strong staff of special inspectors was employed to insure that the embankments were securely anchored to the original ground, and that there was a proper relationship between the materials tipped, their moisture content, and the method of consolidation employed, according to the specifications covering all these details and rigidly enforced by the inspectorate.



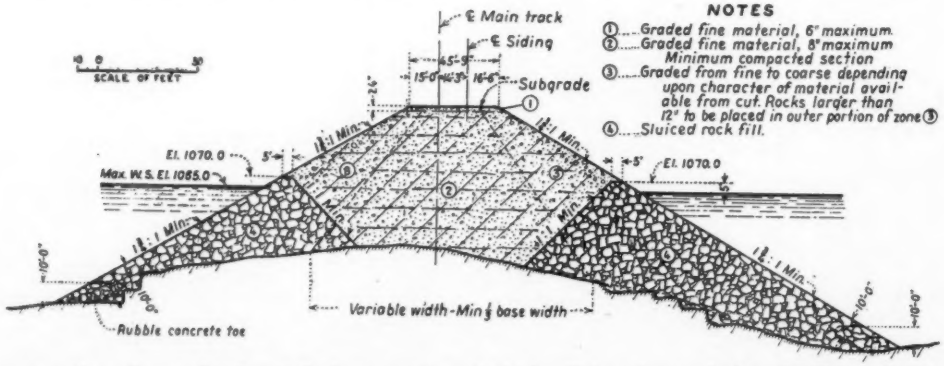
Sketch showing the existing (dotted) and new S.P.R. alignments between Redding and Delta. The numerous creeks involving heavy bridging will be noted, also the location of the Pit River bridge. The Sacramento is crossed once near Redding and three times near Delta

Earthwork Refinements

This anchoring was effected by removing the original ground surface and benching the stable subsoil in 4 ft. to 12 ft. wide horizontal benches, blasted out of rock where necessary. Even where ground level was flat and smooth the original unsuitable surface had to be removed and the stable subsoil deeply ploughed to insure efficient bonding between fill and natural ground. Other specifications insisted that where the material for a fill consisted of too high a proportion of sand to prevent binding, it was to be mixed with other soil having greater binding properties. Generally, coarse material had to be mixed with finer soil spread over it as tipped; the fine material was obtained from borrow pits, if necessary. Clods had to be broken up and no rocks larger than 8 in. diameter were allowed in the middle third of any embankment, and none over 6 in. in the top 2 ft. of a fill. All material was laid in layers not exceeding 8 in. thick, and the best material was selected for the top 12 in. Each layer was thoroughly consolidated by rolling with the mechanical equipment before the next layer was tipped, if necessary with water sprinkled over it to assure consolidation. If the material tipped was too moist, it had to be allowed to dry out or to be mixed with drier soil before the next layer was superimposed.

Special Methods to Consolidate Fills

Special attention was paid to the consolidation of the middle third of each embankment. Frequent field and laboratory tests were made both before and during construction of the consolidation of a wide variety of materials, and

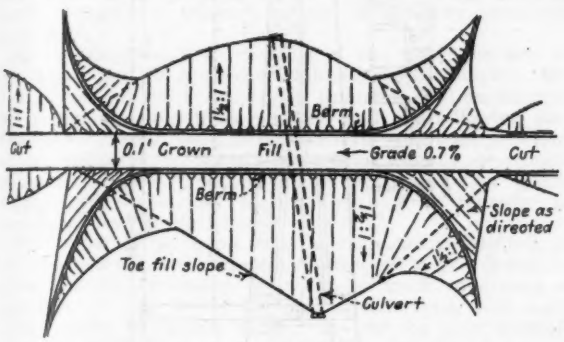


Typical cross section of an embankment the lower portion of which will be submerged when the Shasta dam is completed

weight-moisture-plasticity charts were compiled. Thousands of field check tests were also made during the construction. The laden lorries and other vehicles were run over the middle third, the empties returning over the outer third strips. Harrows were used to break up clods and mix varying materials, and rock rakes attached to tractors pushed rocks over 8 in. out of the middle third. In the case of rock fills, sheepfoot rollers had to pass so many times over each spot, and their types, weight, speed, and the spacing of the knobs and weights on individual knobs were all laid down in specifications to suit each set of conditions for consolidation. So efficient have all these methods of consolidation proved, that thousands of field tests have shown volumes of embankments to be less than that of the same material in its natural state.

Protection from Damage by Rainwater

In an area with a rainfall of 100 in. a year, mostly occurring within two or three months, the importance of surface protection is considerable. To prevent damage to the side slopes of banks by the run-off from the top face, windrows were thrown up by bulldozers along each shoulder of the embankment at the end of each day's work, to divert surface water to suitable drain-off points. Berms were provided in the side slopes of all deep cuttings; they are 16 ft. wide and slope backwards away from the longitudinal centre line, and are pitched longitudinally to carry off the water to the ends of the cuts; the berms are at 20 ft. vertical intervals. Earth or rock fillets were constructed on both



Earth fillet construction at junctions of cuts and fills

sides of the formation at intersections of banks and cuttings. These fillets direct the water from the cuttings away from the toes of the adjacent banks. Additional height of bank to allow for ultimate sinkage took the form of a longitudinal camber, and was given despite the fact that the methods used for constructional consolidation insured that in embankments up to 100 ft. in height ultimate sinkage would rarely exceed 0·5 per cent. of the total height.

Embankments Washed by the Impounded Water

Where embankments will be washed by the waters of the future reservoir, they are supported by rock fills carried up to 5 ft. above maximum water level, as shown in the accompanying diagram. The interstices between the rocks were filled with gravel and rock chips sluiced into position by large-bore hose streams of water. The toes of most of these rock sections of fill are constructed of rubble concrete to a height of 10 ft. It is noteworthy that some of the cuttings are over 100 ft. deep, and that fills run up to 105 ft. in height. Also that there are 12 tunnels having an aggregate length of 6,357 yd.

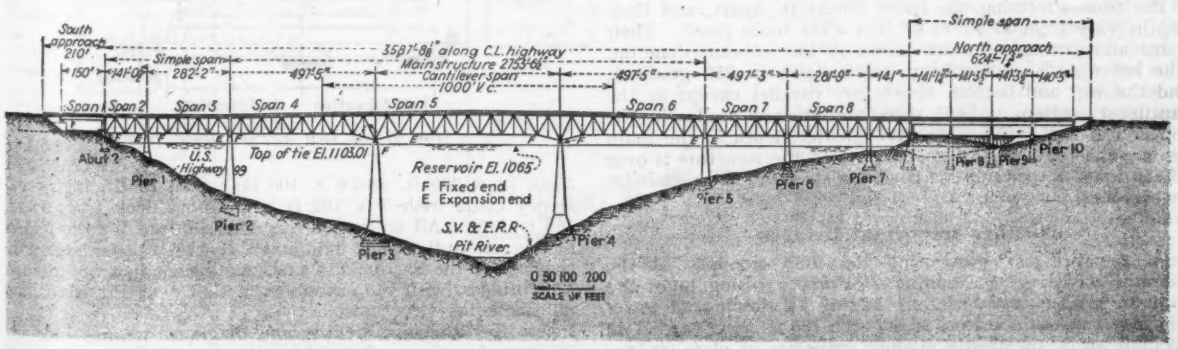
Bridges and Culverts

Altogether, there are over 230 waterway structures on this 30-mile diversion, including eight major bridges with an aggregate length of over 12,200 ft. The longest is one of the four Sacramento river bridges, 4,347 ft. long, and there are also six single and double reinforced concrete arches, totalling 1,152 ft. in length. The principal kinds of culvert used are of the reinforced concrete box type, of which there are 79 with a total waterway of 10,574 ft.; reinforced concrete pipe culverts, 55 in number, totalling 3,338 ft.; 77 corrugated iron pipes 5,716 ft. in aggregate diameter; and 6 2 ft. 6 in. pipe syphons.

350-ft. R.-C. Piers Designed for Stability in Earthquakes

By far the most interesting and the largest bridge on this main-line diversion is that spanning the Pit River—a tributary of the Sacramento—part of which falls in the area that will be converted by the completion of the dam into the reservoir. To avoid inordinate additional length, the realignment has to cross Pit River valley where it will be submerged under maximum depth of nearly 400 ft. of water, and in order to use economical lengths of spans, the piers supporting them had to be 350 ft. high. Such a height is not unprecedented in steelwork, but steelwork would be impracticable for permanent submergence, and the reinforced concrete piers of this height are probably unique, especially as they are in an earthquake area.

The bridge carries the railway on its lower deck, and a 44 ft. roadway on its upper deck, as shown in one of the accompanying diagrams; rail level will be 38 ft. above maximum water level. Interest centres mainly in the great central piers. As they will be almost entirely submerged, full hydrostatic uplift was considered as acting upon them. For anti-seismic stability a basis for design was obtained from mathematical analyses and practical shaking table investigations. Actual seismic interstices measured during the Long Beach and Helena earthquakes were applied to the piers, and though they proved sufficient to overturn the piers if applied as steady forces, it was found that the lateral movement of the foundation tending to overturn the pier would reverse itself before the mass of the pier could follow such movement, and the pier would, therefore, not overturn, but only rock. Experiments with a model on the shaking table confirmed these mathematical conclusions. Incidentally, this probably explains why certain bridge piers and other similar structures did not overturn during those earthquakes. The following forces were, therefore, considered in the design of the piers: horizontal earthquake forces acting on the live load, on the superstructure, on the pier, and on the water—the skin friction

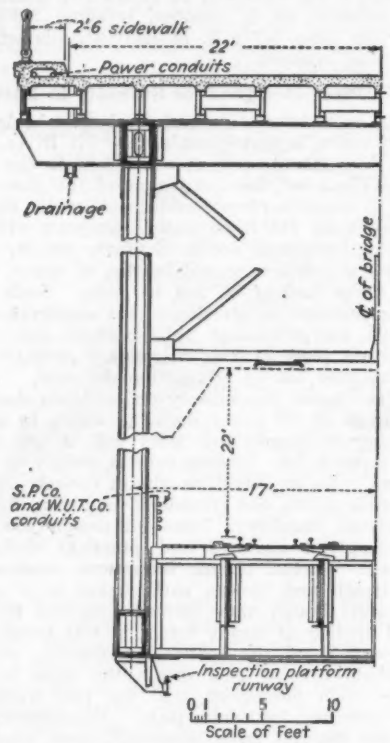


General elevation of Pit River bridge showing cross section of future lake at this point

effect of submersion was determined by a pendulum experiment in which a pier model was suspended in water—also those forces due to the hydrostatic uplift.

The base of each pier which, in all cases, is founded upon solid rock, was designed so that there would be little or no uplift when the pier was subjected to the most severe combination of normal forces, including full hydrostatic uplift, traction or braking force, wind, and sway of locomotive. The shaft also was so designed that it would resist the greatest combination of earthquake and wind pressures. Other special features were the artificial cooling of the concrete in the main pier bases to preclude shrinkage cracks, and the installation of a series of electric stress-measuring devices beneath the bases to permit subsequent observations of the foundation pressures to be made under service conditions.

The larger piers are, as the diagram shows, cellular in construction throughout the lower half, and the upper 100 ft. is of H section; the intermediate 67 ft. is rectangular and



Cross section of main span showing roadway above and railway below

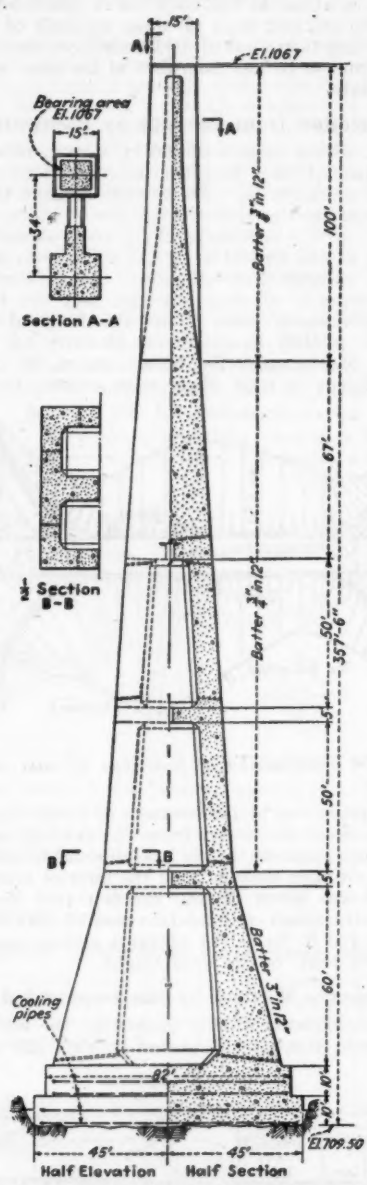
solid. The main reinforcement consists of 2-in. square bars, butt-welded into continuous lengths; the welds are staggered.

The trusses forming the spans are 34 ft. apart, and their depths vary from 57 ft. to 87 ft. (at the main piers). Their spans and arrangement are shown in the relevant diagram. The lower deck and railway are on a 1 in 250 gradient, and the top and bottom chords are parallel except in the cantilever sections, where there are upward grades in the top chord and roadway to give greater depth in the main span. The total weight of steelwork in the structure is over 15,250 tons, 57 per cent. of it silicon steel and the remainder carbon steel.

Other Important Bridges

Of the bridges constituting the four crossings of the Sacramento River, the southern or first crossing takes the form of a long trestle viaduct having 74 simple and tower spans and three deck truss spans each 165 ft. long, carried on concrete piers; the trestle viaduct spans are of plate girders. The maximum height to rail level is about 100 ft. and in the whole structure there are 5,910 tons of steel and 12,800 cu. yd. of concrete. The second crossing consists of three 200 ft. simple deck truss spans with two deck plate girder spans of approximately 100 ft. on each side of them. The maximum height is about 200 ft. The third crossing has one 200 ft. deck truss span and six 90 ft. plate girder deck spans, the maximum height being some 100 ft. The fourth crossing is composed of three 100-ft. plate girder deck spans.

Other important bridges are over Salt creek (4 × 175 ft., 3 × 100 ft., and 4 × 90 ft. spans, 165 ft. high); O'Brien



One of the two 350-ft. main piers

creek (2 × 200 ft. and 6 × 100 ft. spans, 180 ft. high); and Doney creek with 3 × 192 ft. continuous deck truss spans, 155 ft. high. All trusses on this diversion are Warren girders resting on anti-seismic reinforced concrete piers, except in the case of the Sacramento first crossing viaduct approaches. The bridges, with the exception of that over Pit River, are all single-line structures.

For the foregoing details and diagrams we are indebted to our American contemporaries the *Railway Age* and *Engineering News—Record.*

CODED TRACK CIRCUITS

The coded track circuit, introduced about seven years ago, has been used for a number of important installations in America, eliminating line wires

FOR many years no really fundamental change has been introduced in track circuit operation, although valuable improvements have been made in relays and other items of track circuit equipment, especially in a.c. apparatus, and special methods worked out, such as the transient and high voltage principles, to meet local conditions and difficulties. Of recent years, however, a new line of development has been opened up, with what ultimate general success remains to be seen, by the application in America of what has been named the code principle, under which the energy supplied to the track circuit is continuously interrupted, in varying forms of regular sequence, with the object of acting selectively on the signal apparatus proper and producing several indications at the same signal location, without the aid of line wires, a purpose for which previously the polarised track circuit had been used to some extent.

The code principle, using the term in its widest sense, has of course long been known for other purposes and has found a remarkable application in the modern C.T.C. and cab signal systems, but its use for track circuiting, although possibly suggested thereby, is not of necessity associated with them.

At the October, 1940, meeting of the Signal Section of the Association of American Railroads in Washington, Mr. J. I. Kirsch, of the Pennsylvania Railroad, read an interesting paper on coded track circuits, and the following particulars are chiefly based on his remarks. The code principle, in its application to signalling, is being rapidly developed, but what follows represents actual apparatus now giving regular and satisfactory service and may be regarded as broadly typical of the ideas involved.

The coded track circuit may be conveniently defined as one in which the feed current is interrupted to give it definite characteristics, depending on traffic or track conditions in advance. It may be of the d.c. or a.c. type, with such arrangements for power supply, as may be most suitable according to circumstances. In 1934 a 20-mile, four-track installation was made on a steam railway, following some earlier trial work, and may be considered as the broad basis of the development effected since. Several sections of line, of appreciable length, are now equipped, some 500 track-miles of the d.c. system alone being stated to be in service.

The D.C. Coded Track Circuit

The general principle of one arrangement of the d.c. coded track circuit, for controlling three-aspect signals, is illustrated in Fig. 1. Its essential components are:—

(1) The code transmitter *CT*, which interrupts the main feed 75 times a minute, if signal *B* is at "stop" (*H* relay down) and 180 times a minute when it is at "caution" or "clear" (*H* relay up); (2) the code following relay *CTP* which, being operated by the interrupted feed, in turn similarly interrupts the actual track rail feed; (3) the track relay, which, suitably designed to do so, necessarily operates in consonance with the code and, through its back and front contacts, alternately energises one or the other winding of the (4) de-coding transformer *DT*, which accordingly delivers a.c. of a frequency of 1·25 (on 75 code interruptions) or 3 (on 180). This a.c. current is, by means of contacts *X* on relay *TR*, converted into d.c. to energise (5) the usual *H* signal control relay, which, of course, must respond, in order to control signal *A* to yellow (caution), to whatever code is received. The a.c. output of *DT* is also fed to (6), the so-called clear de-coding unit, *DU*, so electrically tuned that only on the 180 code being received will d.c. reach (7), the D signal control relay, controlling the green (clear) indication. (The exact type of signal controlled by the *H* and *D* relays is, of course, immaterial.) By sending an additional and different code from the feed point in advance, a fourth indication at signal *A* can be governed, if required, and so on. Where several track circuit feed points are near together, as for example on multiple track lines, the code transmitters can be common to them; separate ones are not necessary.

Fig. 2 shows a further typical example of d.c. coded track circuiting now in service, in which the ordinary three-aspect signal controls have an approach-lighting control added to them, effected by sending a code from signal *A* to signal *B*, during the "off" intervals of the code sent in the reverse direction. Only the apparatus necessary to an understanding of the principles involved is shown. The circuits are relatively simple, when separated out.

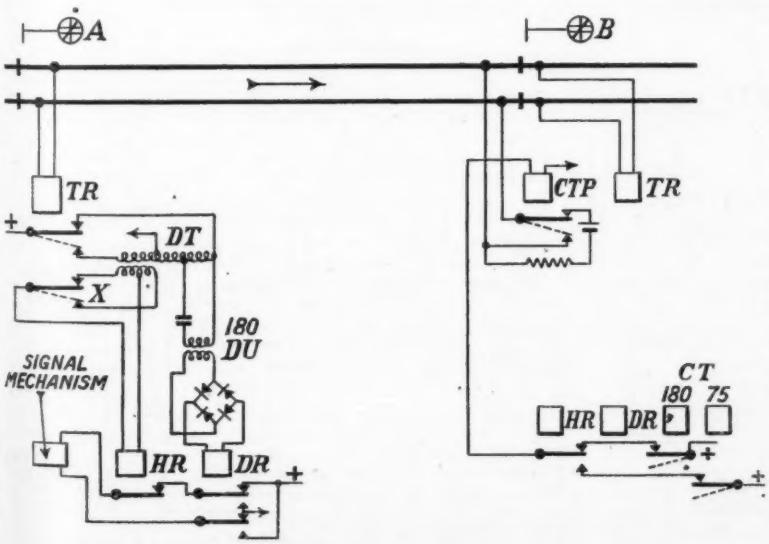


Fig. 1—Illustrating principle of ordinary D.C. coded track circuit

The track feed is code-interrupted at signal *B* by the relay *CTM*; the method of operating the latter is shown in the apparatus at signal *A*, where the *CTM* relay for the section in rear of that appears. The two code transmitters (75 and 180) are set working through the contacts of the *H* relay for signal *A*, which also connects their transmitting contacts to *CTM*, as the conditions require. The coded track current is received over a back contact of relay *TRPA* to the code following track relay *TR*, which is of special single contact construction and actuates its repeater *TRP*, the contacts of which feed the decoding transformer to act on the *H* relay in the manner already explained, and, by a second such transformer, influence the clear decoding unit and *D* relay. So far as the "caution" and "clear" signal controls are concerned, therefore, the working is effectively the same as that seen in Fig. 1.

It remains to be seen how the approach-lighting effect is transmitted from *A* to *B*, and the *AP* and *APP* relays operated.

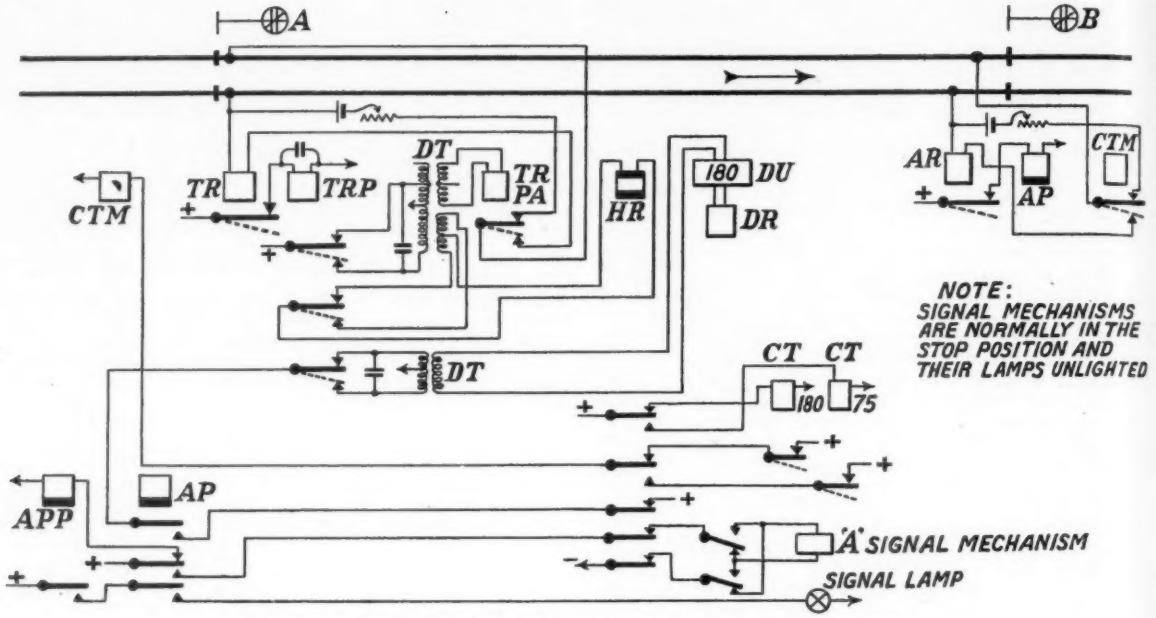


Fig. 2—D.C. coded track circuit with coded approach lighting action

When the section is clear, relay *AP* must be held up to keep the adjacent signal dark. The impulses which do this have to come from the signal in rear during the intervals when the code being sent back to it is "off." This is effected by relay *TRPA*, which has polar features. When the decoding transformer is energised by *TR* (and therefore *TRP*) being up, the impulse received by *TRPA* pulls its armature down, but when *TRP* drops the opposite effect is produced and *TRPA* picks up. Matters are so proportioned that *TRPA* remains up for a shorter period than the shortest "off" period of the incoming code and, while up, sends a feed from *A* to *B*, energising relay *AR*, and in turn *AP*. The latter, being slow releasing, will remain up during the falling and rising of *AR*. As soon as the section is occupied no impulses can reach *AR* and the approach relay *AP* is consequently released. In the arrangement shown *AP* actuates a second slow release relay *APP*, and both must be down to light the signal lamp, while the signal mechanism—searchlight, for example—is itself not in circuit at all until *AP* releases. The delay on *APP* allows it to take up the correct position, depending on the condition of the *H* and *D* relays, before the light appears. This is really therefore a "normal danger" arrangement, with approach lighting and is adopted when it is desired to economise power. Block sections up to 11,000 ft. long, ballast resistance conditions allowing, are being worked in this way—that is without a cut section—but for British operating conditions the giving of a distant indication so far from the stop indication would seldom be suitable.

A necessary consequence of the arrangement is that the "clear" indication of a signal, while being a reflection of the condition of the length of track concerned, does not positively repeat the position of the signal mechanism in advance, as this remains de-energised until the section immediately in rear of it is occupied. In a modification of this arrangement no code is sent in the *AB* direction, the *AR* relay at *B* being in series with the ordinary coded feed but beginning to operate only when, owing to the approach of the train, the current has increased sufficiently to make it do so, thus shortening the approach action to about a third of the block section.

A.C. Coded Track Circuits

These are, in general principle, similar to the d.c. type, being arranged to meet the case where a.c. working is essential, as on electrified lines, or desirable for other reasons. Fig. 3 is a diagram of a typical installation, having interest-

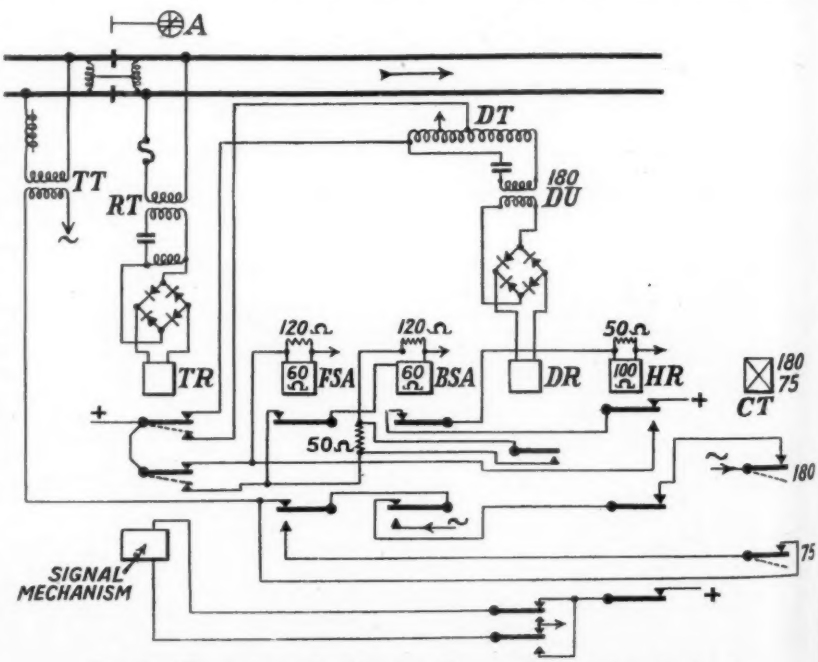


Fig. 3—Illustrating principle of ordinary A.C. coded track circuit

ing features. The usual *D* and *H* relays are used to control the signal mechanism and the incoming coded a.c. passes through the resonant transformer unit *RT* to reach the d.c. code following track relay *TR*, which controls the *D* relay in the manner already described. The coded current to the track circuit in the rear is supplied through the transformer *TT* from the motor coder *CT*, with appropriate contacts, as shown. In the normal condition, given in the figure, the 180 code is fed from *CT* (180 contact), via *HR*, *BSA*, and *FSA* up, to *TT*. The *FSA* and *BSA* relays are provided to obtain special safety features.

As a train clears the section controlling signal *A*, all relays being then, of course, de-energised, the 75 (yellow) code is received and relay *TR* begins to follow. When it first picks up it in turn picks up *FSA*, and when it drops it picks up *BSA*, over *FSA* up. Both these relays have slow release snub-windings, but that for *BSA* is opened, so ensuring a rapid fall for that relay, if *FSA* releases. When *TR* is first energised it also sends an impulse to pick up the *H* relay, which thereafter remains held on a stick circuit over *BSA* energised. All the time, therefore, that *TR* is responding to code *FSA*, *BSA*, and the *H* relay remain held.

If *TR* is de-energised by a train passing *A*, *FSA* is released, releasing *BSA* and *HR*. If *TR* should be irregularly held up against its top contacts, then *BSA* would release and cause *HR* to do so. The control of the *D* relay and the signal mechanism calls for no comment. A further interesting feature of this arrangement is the protection afforded against broken down insulated joints. If a train has passed *A* and produced a joint breakdown then, at first, with all relays (*DR* not being concerned) de-energised, the 75 code passes to *TT* and the section in rear and will irregularly reach *TR* when the train has receded a certain distance. Immediately on *TR* picking up from this cause, *FSA* is picked up, but *BSA* being as yet down the 75 code is at once replaced by a steady feed and *TR* and *FSA* must remain held up, so "locking out" signal *A* at "stop."

Further, if, in these circumstances, *TR* is momentarily shunted, *BSA* will pick up and cut off the steady feed, so that *TR* must remain down, *FSA* also falling after its slow limit ceases. This instantly releases *BSA* and the "lock out" effect becomes once more established with the first impulse through *TR*. To ensure this "lock out" action being positive under all conditions, part of the slow snub resistance of *BSA* is short-circuited while *DR* is down, that is while the slower code is being received.

When a cut section is necessary it is arranged as in Fig. 4, the relay *TR* repeating to the section in rear, *via TT*, the same code as it receives. The relay *BSA* prevents a steady feed, say one resulting from broken down joints and

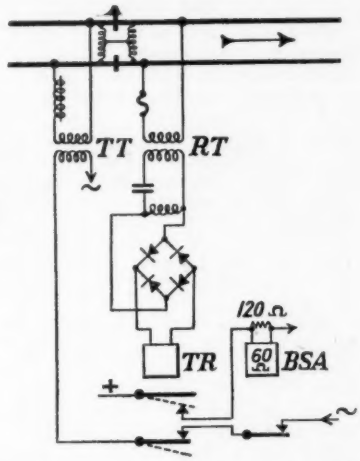


Fig. 4—Cut section with A.C. apparatus

the "lock out" action just described, from being transmitted beyond the cut section point. If *TR* ceases to code and is held steadily energised, *BSA* shortly afterwards opens and disconnects the feed.

It is understood that many interesting applications of coded track circuiting have been worked out, including controls for two direction traffic working, and that the high shunt values obtained with the system and certain other features are attracting increasing attention in America.

THE LONDON TRANSPORT BUILDING DEPARTMENT

Abstract of a brief account of the work of the department, in peace and war, contributed by Mr. J. F. Woollcombe to the proceedings of the Permanent Way Institution

THE primary function of the building department of the London Passenger Transport Board is to maintain all buildings, tunnels, bridges, and other structures of the board, both great and small, ranging from the Lots Road Power House to a shelter for bus passengers in Epping Forest. The properties maintained total 1,400, including 550 bridges as well as 16 miles of tunnel (excluding tube tunnels), and in addition 3,000 properties of other types not directly related to traffic requirements. In the list of 1,400 properties, such buildings as the bus overhaul works at Chiswick, the railway works at Acton, and the tramway and trolleybus works at Charlton—each covering many acres—are counted as one unit. With the development of the board's services since its formation in 1933, the functions of the department have been extended considerably, and it is not now an uncommon thing for it to carry out, with its own labour, large and important reconstruction works. Practically all of these must be carried through many stages in order that there shall be little, if any, interruption to traffic. It is this point, the maintenance of traffic, which explains why it is usual for the department and not contractors to be employed on such special jobs. It may be thought that contractors with their larger resources, would be cheaper, but the department has been able to compete because its normal routine duties give it that precise knowledge of the inter-working of all departments which is so valuable in the co-ordination of an intricate piece of work. Sub-contractors are, however, employed for all works for which they are especially equipped.

Control Divisions

The headquarters of the department is situated in the south-west of London. Here are the main offices, workshops, and yard, with accommodation for a large number of lorries of all types. For convenience of control, the board's area is divided into four parts, comprising two inner and two outer areas, north and south. Both inner areas are sub-divided into three districts, with two foremen to each. A superintendent is responsible for carrying out the work within each area by direct labour. In the two outer (country) areas the work is entrusted to local contractors under the control of the building department's supervisors. A separate contractor has been appointed for every property of any size. At the headquarters of the building department there are seven workshops, namely, fitters and smiths shop, concrete casting shop, joiners shop and mill, signwriters shop, sign fixers section, transport section, and plant maintenance section. In these shops 500 men are employed. Much of their work reaches a very high standard of workmanship, and

this is particularly true of the signwriters shop where are made nearly all the board's direction signs for rail and road use, work requiring highly skilled craftsmanship. Another unusual job—in the joiners shop—is the construction of full-size and scale models of various schemes for improvements, tunnel works in particular. These enable a completed job to be visualised easily and facilitate the determination of the best arrangement.

The New Works Programme

On the outbreak of war the board was engaged on the final stages of a large programme of new works, including railway extensions. For these the department provided a great deal of equipment. Noise-reduction slabs were manufactured and erected throughout the length of the new tubes; many miles of concrete cable-posts and cable-ducts were made and fixed and dozens of switch-houses were built. On the Metropolitan Line, between Baker Street and Harrow-on-the-Hill, more than 50 per cent. of the station platforms were reconstructed; buildings were underpinned, walls built, and innumerable items of equipment supplied and erected. On the Bakerloo and Central London tubes, platform extensions were built and equipped with all finishings within the recently lengthened station tunnels.

Overlapping with the last stages of the new works programme was the large programme of air raid precautions which London Transport began prior to the war and which even now is being added to day by day. This included the safeguarding of power stations and signal cabins against the effects of blast and splinters, the erection of shelters, emergency offices, and telephone exchanges, the construction of blast walls and concrete anti-flooding dams at tube station entrances, to mention but a few items. In peacetime the end of one programme of new works was usually the signal to begin preparing for another. On this occasion the new works were suspended so that the department might switch a large part of its resources on to another problem, the like of which it had not known before. The intensity of air raids was a new problem, for which it was difficult to prescribe in advance.

War Emergency Organisation

The department's existing organisation, tuned up to meet the emergency, was found, after trial and error, to be the best basis for the new arrangements. The existing offices, sub-offices, and workshops functioned as before, and a new departmental war headquarters has been set up in a central position. This is in constant touch with the Chief Engineer's (Civil) War Headquarters. Here the messages reporting damage to the board's property are received within a few minutes of the incident and transmitted to those best qualified to deal with them swiftly and efficiently.

After short experience of raiding, it was found that only small numbers of men were needed to stand by at night. Before dawn it is not easy to judge the best method of dealing with substantial damage. With daylight, however, a scheme can be devised quickly, and put into operation. Thus it is that arrangements are made for a large force of men to be available at daybreak. When night raids are frequent these men report to centres near to their homes, whence they may be dispersed speedily to the jobs where they are most needed. Their task is to clear debris and prepare the site so that when the remainder of the men come to work at their usual time they can tackle the main problem instantly and with maximum efficiency. Where the damage is in the outer area, the local contractors who are normally responsible send men to the site. A London Transport supervisor meets the contractor at the site and gives him the necessary instructions.

Equipment for every purpose is standing ready for use, including such things as heavy timbers and steelwork, and even reinforced-concrete tunnel arch sections which can be assembled at any point on the railways where damage may occur. In short, the department has developed a technique for dealing with air raid damage and can deal with any type of problem which may arise. In all this work the building department works in close collaboration with the other engineering sections, particularly the Permanent Way Department,* receiving from all of them the most valuable co-operation. This scheme has worked exceedingly well, and, although during the past months the ingenuity and powers of improvisation of the department have been taxed very thoroughly, here is a creditable list of occasions when "first aid" treatment during the night has enabled the transport services to begin as usual the next morning or within a surprisingly short time after.

Sheltering in Tube Stations

In less spectacular fields the department has assumed equal responsibility for other types of war work; for example, that for the benefit of the shelterers who nightly occupy Underground stations. The department has provided drinking fountains for the shelterers, receptacles for litter, first-aid stations, lavatory accommodation, and has fixed the bunks. In connection with the refreshment service for shelterers, the department has erected and equipped four food depots, one for each tube line. Every station had to be provided with strongly-constructed containers which would withstand constant journeys between depots and stations. On the platforms the catering staffs had to be supplied with the water and electricity for the boilers.

Another instance of the rapidity with which the department must act at short notice occurred when London Transport announced that women were to be employed as conductors, and in the overhaul work. Instantly, arrangements had to be set afoot to provide changing rooms, rest rooms, and lavatory accommodation at 90 garages and depots. All this work has to be completed in record time to satisfy the requirements of the engineering and traffic departments.

Other items of equipment which the department has had to turn out in a hurry are information kiosks, portable bus-stop signs which have proved invaluable for emergency traffic diversions, and numerous items of equipment for the board's A.R.P. organisation, including spotters' posts, ladders for fire fighters, guard rooms, dormitories, and canteens. Upon the department has fallen also the whole of the task of providing for the adequate blackout of the board's properties. It is a point of honour with the department that, however many windows of a building may suffer, on any night, the staff who must work there will be able to switch on every essential light the next evening. The department has also been responsible for steps to minimise danger due to flying splinters of glass, for the provision of blast walls, and the strengthening of vulnerable points, such as inflammable stores, power houses, and signal boxes.

Although there has been some relaxation of the standard of decoration and cleaning, essential maintenance work continues as usual.

This review of the work of the building department is necessarily incomplete. Not until after the war will it be possible to tell the full story of the difficulties which have arisen and the manner in which they have been overcome. Neither can any indication be given of the plans for rebuilding destroyed or damaged properties after the war, for any such programme will be affected by Governmental plans. However, it is safe to assume that an extensive programme of work will be necessary, not merely to replace the small number of damaged buildings, but also to modernise others and to provide for the ever growing needs of transport.

NATIONAL SALVAGE DRIVES.—Nation-wide endeavours to reclaim materials of value to the war effort continue unabated. The demand for metals of all kinds is still very great and appeals have been made to all works which may have scrap for disposal to get in touch with the local salvage authorities. Since the entry of Japan into the war and the subsequent loss of rubber producing areas in the Pacific, coupled with shipping difficulties, endeavours have been made to salvage as much rubber as possible and there is a demand for such items as worn tyres, and indeed any articles containing rubber. The need for the greatest economy in the use of paper and for careful salvage of all waste paper will remain as long as the war continues. Every load of waste paper which is turned over to the local salvage collectors or sold direct to waste paper merchants is an important contribution to the war effort, for paper forms an indispensable constituent in a great number of vital munitions of war.

* See THE RAILWAY GAZETTE of January 9, 1942, page 59

ELECTRIC TRACTION SECTION

Stockholm-Roslagen Railway Electrification

Extension of electrification to Vallentuna and Österskär on this Swedish narrow-gauge line involves working on two d.c. voltages, with automatic change-over control on motor-coaches

THE Stockholm-Roslagen Railway, which operates 325 km. (202 miles) of 0·891 m. (2 ft. 11 in.) gauge route northwards from the Swedish capital, of which 53 km. (33 miles) are now worked electrically, introduced electric traction on its inner, or Djursholms, lines as far back as 1894. Extensions followed very slowly, the latest, until the recent ones dealt with below, being between Djursholms Ekeby and Roslagsnäsby (2 km.), and Altorp to Lahäll and Näsby Park, the latter electrified in 1935. Much improved traffic facilities were obtained by the installation in 1926 of automatic colour-light signalling between Stockholm and Stocksund (5 km.), later extended to Ösby (2 km. further). The steam trains and some of the electric trains work to

Sketch map of electrified section of Stockholm-Roslagen Railway

and from the company's Stockholm East terminus, but many of the electric trains continue over a single-line extension along the street to Engelbrektsplan, half a mile nearer the centre of the city.

The outer suburban districts of the city served by the line include the residential areas along the Österskär branch and the towns of Täby and Vallentuna along the main line. From 1913 to 1938 the traffic on the Österskär route increased sevenfold. The public demand for improved services and connections was met as far as possible with the existing resources, but more rolling stock and locomotive power being eventually called for, it was decided to electrify to Vallentuna and Österskär, 23 km. and 29 km. respectively from Stockholm East.

The d.c. system of traction was adopted in 1894 and was continued for the extensions made until 1935. It was considered that no financial advantage was to be gained by departing from it, nor was a change to a much higher voltage over the whole route found advisable, although the voltage on the already electrified sections was raised from 660 to 750. But a decision was made to use the 1,500-volt d.c. system for further conversions, and to fit the motor-coaches with automatic relay switch apparatus to enable them to pass from one voltage to the other without danger or difficulty, the dividing point in the overhead contact line being arranged at a suitable spot between Djursholms Osby (7 km.) and Roslagsnäsby (11 km.). The new extensions were opened in 1939.

Power Generation and Supply

Originally the line was worked from its own steam generating plant at Stocksund (5 km. from Stockholm), provided with belt-driven generators of the type common in the 90's, the line tension then being 550 volts. This plant was enlarged from time to time, and turbines were introduced in 1911. In 1916 power was taken from the Älvkarleby hydro-electric station at high-tension a.c., and transformed and converted by rotaries to 660 volts d.c., but as the regularity of this supply could not be guaranteed until 1926, the old equipment was kept in working order for 10 years as standby in case of failure. In that year it was dismantled and the rotaries replaced by rectifiers. The extensions first undertaken necessitated an increase in, and better distribution of, the supply, and the original substation at Stocksund, 6 km. (3¾ miles) from Stockholm was abandoned, a new one opened at Mörby, about ¾ mile further out, and another at Experimental-fältet about 1¾ miles from the city, the first being fitted with two rectifier sets and the latter with one, both stations working in parallel to feed the section between. Either can be cut out at will. For the latest extensions a substation with two plants has been provided at Roslagsnäsby and one with a single set at Runö, both working in parallel to feed the Österskär branch and main line to Vallentuna; the section between Roslagsnäsby and Ekeby is fed from the former place only. If the traffic to Vallentuna increases sufficiently an additional substation will be provided between that place and Täby.

Mörby and Roslagsnäsby are fed at 22,000 volts from the main Norrviken grid station by double feeders, Runö by a third feeder from another part of the grid, the Experimental-fältet substation being fed from Mörby by a feeder carried part of the way on the contact wire standards. The substations have the latest type of oil switches and cut-outs, with earth detection apparatus and remote control from panel type switchboards, with indicators and lamps. Additional transformers provide for lighting supply and in some cases power for workshops and local machinery. The rectifier sets are of the six-anode type and arranged at Experimental-fältet and Mörby to provide 750 volts d.c., and with a full load rating of 750 kW; the plants at the other

substations are rated at 1,125 kW at 1,500 volts. The 750-volt sets can deliver 110 per cent. overload for one minute, and the others the same amount up to 5 minutes. The rectifiers are fed from 3-phase/6-phase delta-star connected transformers, with the neutral point earthed; the rectifier cathode is connected through the usual switchgear with reverse-current safety feature to the positive busbars. Automatic grid control provides for constant busbar voltage. Time-switch control is employed, but can be replaced by local control or by remote control from Mörby at will. A complete system of remote indication for faults enables all cases of failure to be notified at once, the faulty equipment being automatically disconnected when the circumstances require. The bringing in of the second rectifier set, where two are provided, is also done automatically when the load or other circumstances require it. Protection against interference with telephone circuits and wireless sets is given by smoothing equipment

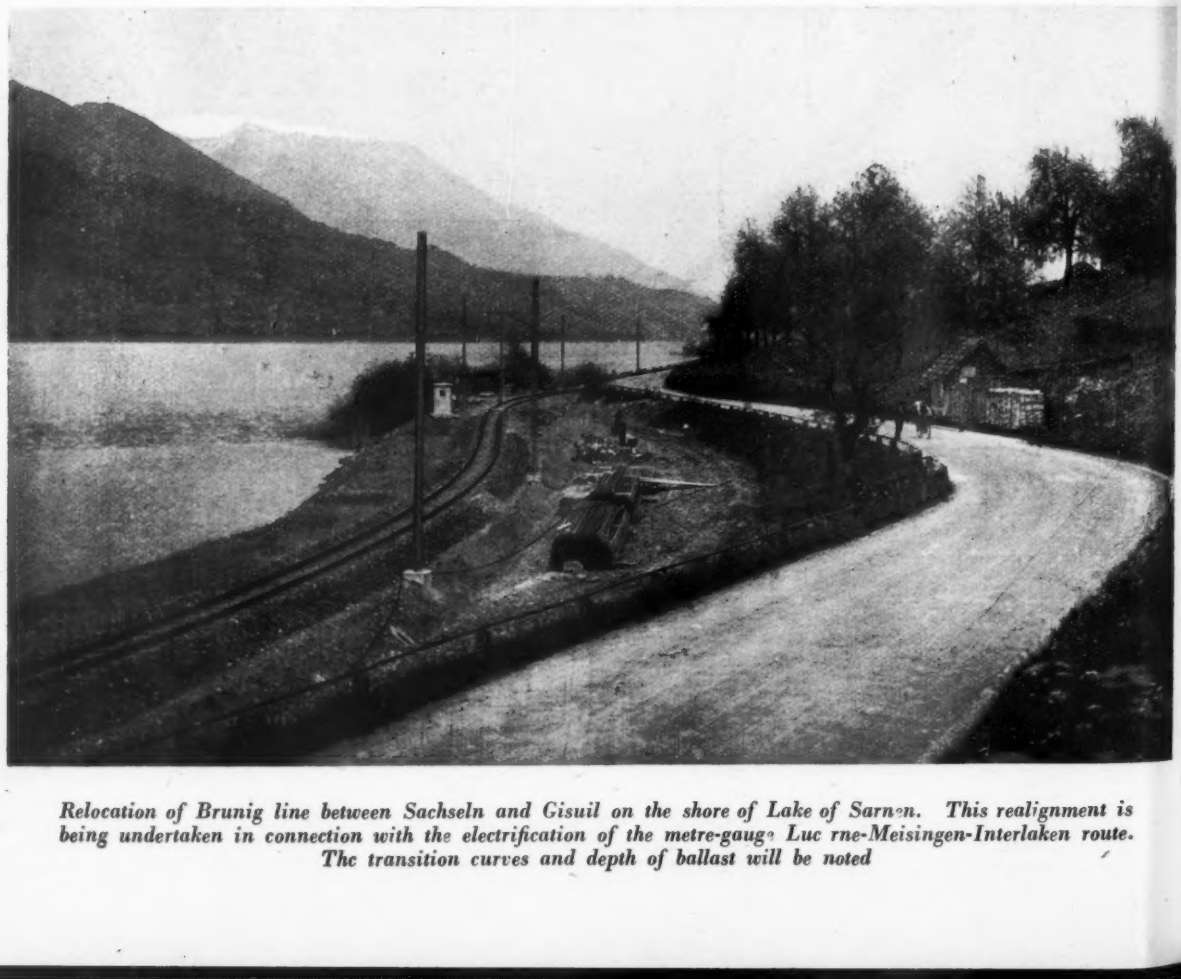
The dividing point between the two voltages is formed by three short sections of overhead wire, the two outer ones being completely insulated from the rest, and the centre one earthed over a suitable resistance for the purpose of quickening the action of the change-over mechanism on the train. The contact-wire system is carried on wooden poles, with automatic compensation. The return circuit is through the rails with welded bonds.

Ten additional motor-coaches were provided for the new extensions by the Asea Company, which also supplied the substation equipment. The principal dimensions of the motor-coaches are: length over buffers 18·45 m. (60 ft. 7 in.); pitch of bogie centres 13·0 m. (42 ft. 8 in.); bogie wheelbase 2·1 m. (6 ft. 11 in.); weight in working order 29·8 *tonnes*; seating accommodation 58, and one luggage compartment. Each four-wheel bogie is driven by two motors, each with an hourly rating of 61 kW at 1,000 r.p.m.; the wheel diameter is 830 mm. (2 ft 8½ in.). There is a driving position at each end, combined in one case with the luggage compartment. The top speed is 75 km.p.h. (46½ m.p.h.).

The main change-over group controller of the motor-coaches is operated electro-pneumatically, under the control of one 750-volt, and two 1,500-volt main relays, the latter being duplicated to eliminate all chance of running on to the higher voltage section without the correct change-over being made. The control current for this electro-pneumatic mechanism is taken from accumulators. The risk of the correct change not being made is practically nil.

The operating connections are such that on 750 volts all motors can be put in parallel, but on 1,500 volts only in groups of two in series-parallel. Each section of the starting resistance is in two portions: parallel connected or series connected accordingly. Current for the multiple-unit control and lighting is furnished by a small motor-generator set; the motor has two sets of brushes, alternately connected so that the r.p.m. are the same on either contact wire voltage, and the generator, which has an automatic regulator, delivers at 125 volts at all times. The brake pump motor is connected to the middle point on this motor when the coach is running off 1,500 volts. The electric heating elements are grouped all in parallel, or in groups in series-parallel, according to circumstances.

Realignment of a Swiss Railway

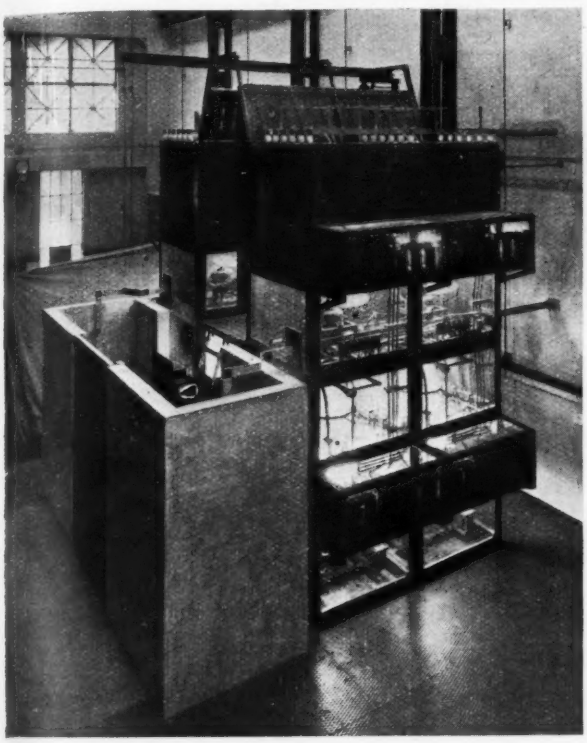


Relocation of Brunig line between Sachseln and Gisuil on the shore of Lake of Sarnen. This realignment is being undertaken in connection with the electrification of the metre-gauge Luc rne-Meisingen-Interlaken route. The transition curves and depth of ballast will be noted

Modernised Traction Equipment In Argentina

Glass-bulb rectifiers replace rotary sets in suburban substations

EARLY in 1939 the Buenos Ayres Western Railway decided that it would be more convenient for its electrified suburban services to use electrical energy from the power company's supply at 50 cycles than from the existing 25-cycle supply. At the same time the electrical equipment would be standardised to conform to the industrial equipment installed throughout the country. This change of supply from one frequency to another made it necessary to alter the whole of the existing rotary converting plant installed in the various substations in which the high-tension a.c. is converted into d.c. at 800 volts for the suburban train services.



The new glass-bulb rectifier equipment, comprising eight bulbs in parallel, at Moreno substation, B.A. Western Railway. The concrete chamber in the foreground houses high-speed circuit breakers

The installation of mercury arc rectifiers to replace the existing rotary machines was decided upon, and this new type of plant seemed to have several advantages for the B.A. Western system. First, it would operate satisfactorily either on the then existing frequency of 25 cycles or the new frequency of 50 cycles, and thus enable the railway to instal the new substation plant before beginning the change-over of the transmission cables to the new supply of 50 cycles at the power house. In this way the change-over could be effected without reducing the available capacity of the plant in the substations, thus maintaining full security of the supply of current to the trains.

Secondly, the conversion from three-phase a.c. at 20,000 volts to d.c. at 800 volts for the railway services could be carried out more efficiently by mercury arc rectifiers than by the then existing rotaries. Again, the new plant is of the static type and requires less attention and maintenance than the rotaries. Where such a plant is used it is possible to control all the stations from a central point, the plants being put in and out of operation from a distance by means of push buttons.

An order was placed with the Hewittic Electric Co. Ltd. for a total of 15,000 kW of glass bulb rectifiers complete with main transformers, to replace the existing rotary machines in the four substations, the equipment comprising the order being installed thus :—

Substations	Sets in each	kW per set	Total kW
Once	3	1,200	3,600
Villa Luro	3	1,800	5,400
Castellar	3	1,200	3,600
Moreno	2	1,200	2,400
			15,000

Two consignments of this equipment, totalling 6,000 kW, arrived in Argentina during 1940 and the remainder in 1941.

Electrical Activities in 1941

Very little traction work and few railway contracts were completed during 1941 by the four big British electrical companies, an annual review of whose work it is our custom to make early each year. The Metropolitan Vickers Electrical Co. Ltd. continued work on the traction equipment for the L.N.E.R. Manchester-Sheffield electrification, and the first locomotive was completed and has been running on the Manchester-Altrincham line. Other traction work was confined to materials for spares and maintenance, and to one or two orders for small shunting locomotives. The associated General Railway Signal Co. Ltd. received orders from India and South Africa, and continued to manufacture essential material for maintenance programmes and railway stock renewals.

The English Electric Co. Ltd. completed the reconstruction of two existing 12,500 h.p. water turbines at the Lake Coleridge plant in New Zealand, which supplies energy to the two N.Z.G.R. electrified systems in South Island, as well as the industrial load. The company also supplied, through the A.1 Electric Welding Co. Ltd., an eight-cylinder 400 b.h.p. diesel engine, alternator, and auxiliary equipment for a rail welding plant for the East Indian Railway. Contracts in hand include several orders for pumpless air-cooled steel-bulb rectifiers for 600-volt trolleybus and 1,500-volt d.c. railway applications.

On the other hand, the British Thomson-Houston Co. Ltd. did no traction work during the year, but several of its activities, such as the development of resistance welding controls, the burning of tar oils and pitches, manufacture of excavator and drag-line equipments, and steel-clad and glass-bulb rectifiers, are of indirect interest to railways.

Transport and traction activities of the General Electric Co. Ltd. during the year were confined to the production of mobile transformer plants and substations, arranged for road transport and rail haulage. Self-contained units with transformer, rectifier, a.c. switchgear, and d.c. output panels up to 750 kW for haulage over roads have been built, and larger groups are arranged on two trailers. Equipments mounted on railway vehicles have been built in capacities up to 1,000 kW a unit.

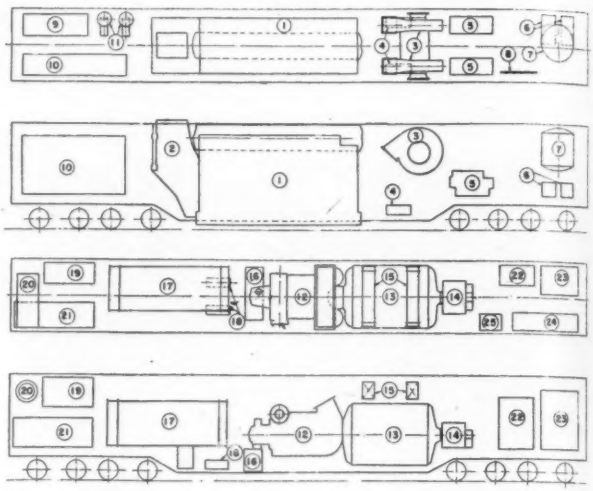
Mobile Power Plants in U.S.A.

The U.S. Navy Department has ordered two plants each of which will be carried on two special railway wagons

TWO 10,000-kW mobile power plants have been ordered from the General Electric Company, of Schenectady, for the use of the U.S. Navy Department. The boilers, turbines, and generators are to be of standard types, but each plant will be carried on two special railway wagons capable of being hauled at speeds up to about 40 m.p.h., and each weighing about 200 short tons when fully laden. The wagons are to be of welded steel construction, and each will rest on eight axles. One will house the power-generating equipment, a condenser, and the necessary switchgear. The other will carry the boiler and its auxiliaries as well as a starting engine generating set. In addition, a mobile sub-station constructed on a standard car will be used in conjunction with each generating unit to assure proper voltage for any naval shore establishment. It is estimated that the mobile power plants should be fully functioning "on the line" within 24 hours of having been shunted into a siding.

The boilers will be oil-fired with Bunker C fuel oil, a supply of which for two hours' operation will be carried in the boiler cars of each of the units, so that they may be put into operation before the oil tank cars are connected up. The total weight of each car is estimated at about 180 tons. The boilers for each unit will generate 140,000 lb. steam per hr. and the turbines, of single-"casing" design, will use the steam at 550 lb. pressure and 825° F. At 3,600 r.p.m. the generators will produce 60-cycle, 3-phase power at 13,800 volts. Forced air cooling will be used. The diagrams are reproduced from our American contemporary the *Railway Electrical Engineer*.

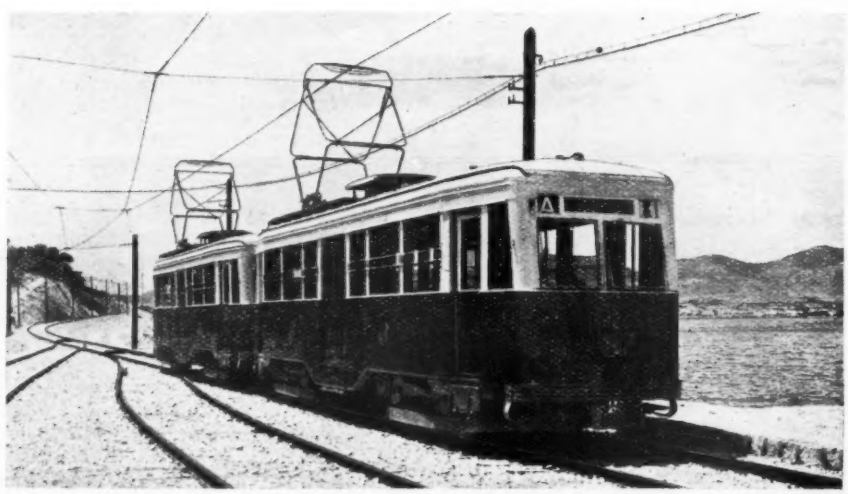
As is shown on the preceding page, where reference is made to the activities of the large British electrical companies during last year, the British General Electric Co. Ltd. has produced mobile transformer plants and substations, arranged for road transport and rail haulage. Equipments mounted on railway vehicles have been built in capacities up to 1,000 kW a unit.



(1) Boiler; (2) economiser; (3) forced draft fans; (4) fuel oil pumps; (5) feed water pumps; (6) feed water booster pumps; (7) deaerating water heater; (8) control board; (9) auxiliary feed water tank; (10) auxiliary fuel oil tank; (11) feed water treating; (12) steam turbine; (13) generator; (14) exciter; (15) generator air coolers; (16) turbine oil tank; (17) condenser; (18) hotwell pumps; (19) air removal apparatus; (20) evaporator; (21) auxiliary turbine generator; (22) auxiliary transformer; (23) main generator switch gear; (24) auxiliary generator switch gear; (25) engine set for starting.

Above: Steam generating car. Below: Power generating car

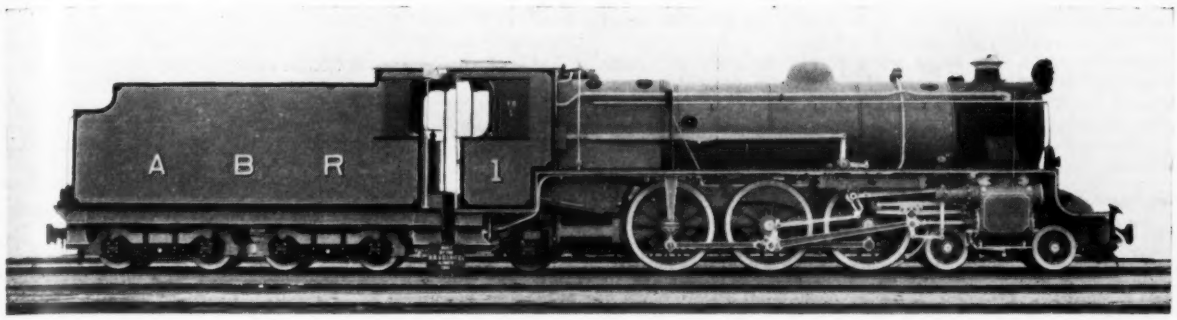
Two-car Train on the Piræus—Perama Railway



This line, of which the Piræus terminus is on the tramway tracks outside the electric railway station, runs along the coast to Perama, about six miles. It opened up for the people of Athens and Piræus a picturesque district which, before the war, became popular for outings. The electric rolling stock was supplied by the General Electric Company of Milan. The picture shows a train on a trial trip

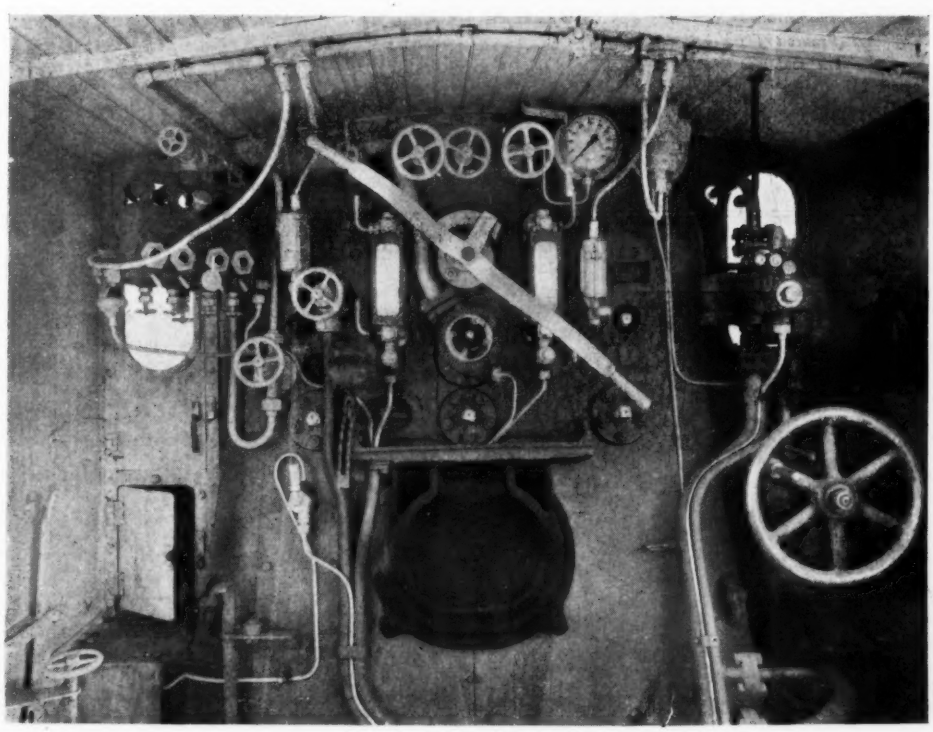
NEW 4-6-2 TYPE METRE-GAUGE LOCOMOTIVES, ASSAM-BENGAL RAILWAY

Nine of these locomotives have been built at the Ajmer works



One of the new Pacific locomotives recently completed at Ajmer

WE have received from Mr. T. D. Macintosh, Locomotive & Carriage Superintendent of the Assam-Bengal Railway, a photograph which we reproduce of the first of a series of nine locomotives of the 4-6-2 type, built in the metre-gauge Central Workshops at Ajmer, Bombay, Baroda & Central India Railway, for the Assam-Bengal Railway, in accordance with the current scheme under which new metre-gauge engines for all Indian railways are built there. The engines were constructed under the personal supervision of Mr. Macintosh and Mr. J. W. Maye, Works Manager, and, with the exception of the tyres, axles, and certain proprietary items, all parts were manufactured at Ajmer from raw materials. All the steel castings, including the wheel centres, were cast in the B.B. & C.I. Railway's steel foundry there. The engines belong to what is generally known as the " YB " class which was designed for mail and passenger services on metre-gauge passenger railways in India, and are built to the Indian railway standard design with the exception of a few modifications introduced at the request of the Assam-Bengal Railway. One of the important features of the design is that Timken roller bearings are fitted on the engine bogie, hind truck and tender wheels, and another



Interior of cab showing arrangement of controls and fittings

interesting feature is the use of a Davies & Metcalfe exhaust steam injector which operates on the left-hand side of the engine, while a Gresham & Craven No. 9 live steam injector is fitted on the right-hand side.

Among other departures from the standard practice are: (1) The piston valves are of Ajmer design and made up of light cast iron heads and four narrow rings. Steam distribution is by Walschaerts valve gear also in accordance with standard practice. (2) The coupled axleboxes are of solid bronze with white-metal bearings. (3) The draw-gear between engine and tender is of the spring-loaded type, also of Ajmer design. (4) The coal capacity of the tender has been increased from 4½ to 7½ tons by deepening the sides of the tender. (5) The fire-irons, instead of being carried at the side of the tender, are accommodated in a chute running along the footplate on the left-hand side of the engine.

The coupled wheels and axleboxes and all motion parts are oil lubricated, and other parts are either grease lubricated or fitted with oil-treated ferrobestos liners.

The principal particulars of the engine are as follow:—

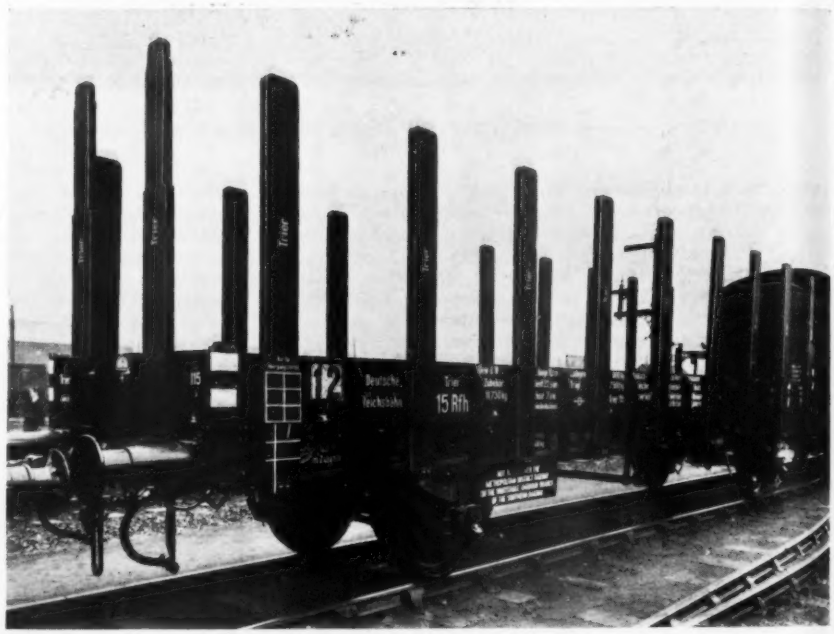
Cylinders, dia.	16 in.
Piston stroke	24 in.
Wheels coupled, dia.	4 ft. 9 in.
Wheelbase, engine	27 ft. 10 in.
,, tender	14 ft.
Total wheelbase, engine and tender	50 ft.
Boiler steam pressure	180 lb. per sq. in.
,, heating surface, total	1,434 sq. ft.
Grate area	23·1 sq. ft.
Length between tube plates	15 ft.
Tubes, no. and dia. (outside)	75 × 2¼ in.
Flue tubes	18 × 5¼ in.
Superheater elements	18 × 1⅜ in.

The tender which is carried upon two 4-wheel bogies has a water capacity of 3,000 gallons and a coal capacity of 7½ tons. The engine in working order weighs 50·5 tons, and the tender 37·4 tons, giving a total weight of engine and tender in working order of 87·9 tons. The maximum weight carried by an individual axle is 9·9 tons. The engine develops a tractive force, at 85 per cent. of the boiler pressure, of 16,492 lb.

Some of the locomotives have been delivered to the Assam-Bengal Railway, and are already in service.

General Service German Freight Wagons

Four-wheel low-sided wagon of the German State Railway with vertical battens to protect its load. This type of general service wagon, with removable side and end battens, is very widely used in Germany, and is justly popular with traders and the railway staff. The particular 17½-ton vehicle shown in the illustration alongside was photographed in England in 1930. The notice board alongside the nearest wheel says: "Not to run over the Metropolitan District Railway or the Whitstable Harbour Branch of the Southern Railway." Reference to the large structure gauge of the Reichsbahn is made at page 211.



Strength of All-Steel Rolling Stock in U.S.A.

The wrecked locomotive involved in the head-on collision on the Western Pacific Railroad on September 22 last between the Exposition Flyer and a light engine. Despite the violence of the impact two trainmen only were killed and ten passengers injured; the all-steel stock composing the train was but slightly damaged. (See editorial comment on page 182)

AN IMPROVED RAILWAY WHEEL LATHE

A new Craven machine equipped with a journal re-turning attachment

A RAILWAY wheel lathe recently completed by Craven Bros. Ltd. of Reddish to the order of the Rhodesia Railways incorporates many refinements. It will turn simultaneously and without torsional strain of the axle, the treads, flanges, and sides of a pair of locomotive, tender, carriage, or wagon wheels from 2 ft. 3 in. to 5 ft. dia. on the tread; it will also turn the rims of wheel centres from 1 ft. 10½ in. to 4 ft. 6 in. outside dia. The inside journals of locomotive coupled and bogie wheel-sets can also be re-turned and burnished on it one at a time. Four jaws in slides are provided on the fast headstock for boring tyres up to 5 ft. dia. on the tread.

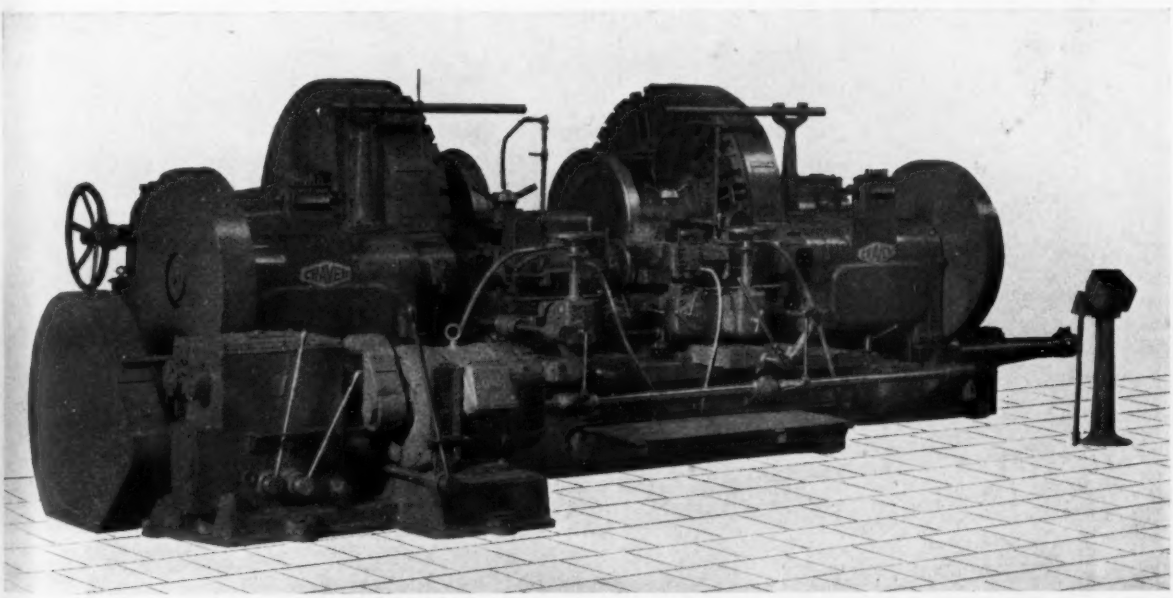
The main drive is direct by spur gearing, from a 45 h.p. constant-speed motor mounted on a baseplate, through reduction gear and six-speed gearbox to a shaft in the bed, and through reduction gear to the faceplate pinion shafts in the headstocks. The loose headstock has motor-operated quick power-traverse motion along the bed, with quick-acting pneumatically-operated clamps. The tool rests are arranged with quick-acting pneumatically-operated tool clamps for the tread roughing and flange roughing tools, and are provided with tool holders and high-speed steel tools for turning the treads, flanges, and sides of tyres, and also for turning mounted wheel centres.

The bed is of deep box-section with planed top and T-bolt slots for the reception of the headstocks and rests. The surfaces are of densened structure. Chutes in the centre portion of the bed allow the cuttings and swarf to fall into removable trolleys at the front, without the lathe having to be stopped. The headstocks are made with wide bases, forming a strong tie to resist the tendency to lift under heavy cuts. The main spindles are of special close-grained cast iron, carried in large front and back capped bearings with gun-metal steps, and improved lubrication; the end thrust is taken by heavy ball thrust washers. Each spindle is bored out and has sliding inside it a steel barrel, arranged at the front end with a strong steel centre to carry locomotive wheels with inside journals, after the outside valve levers have been removed, and also bogie, tender, carriage, and wagon wheels with outside journals. The spindles are each adjustable in or out by a large hand-wheel, with a locking device. The double reduction gear arranged on each headstock is of the spur type, with cast-iron wheels and steel pinions and the shafts are of exceptionally large diameter mounted in long bronze bearings. The bed shaft pinions are sleeved, and rotate in bronze bearings, and are so arranged to relieve the main shaft from bearing loads. These pinions are totally enclosed and all gearing is completely protected; the gears have grease lubrication.

Main Drive and Other Details

The main drive is by a constant-speed motor, mounted on the baseplate and driving through a six-speed gearbox to the driving shaft in the bed, and through spur gearing in each headstock to the faceplate rings, providing six speeds of revolution to the faceplates. An additional slow-down speed is provided, operated by push buttons, for use when dealing with hard spots on the tyres. The main shaft in the bed is carried in bearings with gun-metal bushes, and the pinions are geared direct to separate auxiliary shafts in each headstock, which carry the steel pinions driving the faceplates, thus reducing the torsional strain on main driving shaft, and providing a rigid drive to the faceplates. The gearing in each headstock is completely enclosed.

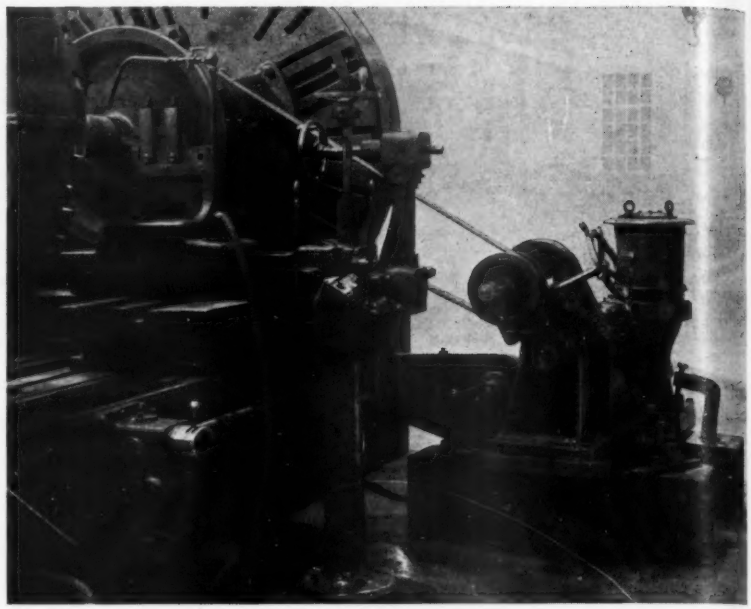
The loose headstock is adjustable along the bed by hand, or by power from a separate reversing motor, half-hour rated to develop 5 h.p., mounted on the planed base and driving through a friction slipping clutch. When in position the headstock is securely locked by quick-acting pneumatically-operated clamps. The pinion on the main shaft driving the faceplate pinion shaft is supported by a bearing moving with it, to take the thrust from the shaft. Each faceplate is fitted with two spoke-type drivers, consisting of strong steel castings with serrated side driving dogs, and with grips to secure the locomotive wheels by the spokes, capable of being adjusted to any desired position by quick-pitch screws and



General view of new Craven wheel lathe for the Rhodesia Railways

nuts and secured in T-bolt slots, with two additional side drivers with clamp bolts for the smaller locomotive wheels. Four side removable drivers for each faceplate are also provided for the carriage and wagon wheels, and have high-tensile hardened steel serrated driving dogs to engage the outer sides of the tyres. A strong cast-iron spur ring with external teeth is attached by turned bolts to the rear of each faceplate.

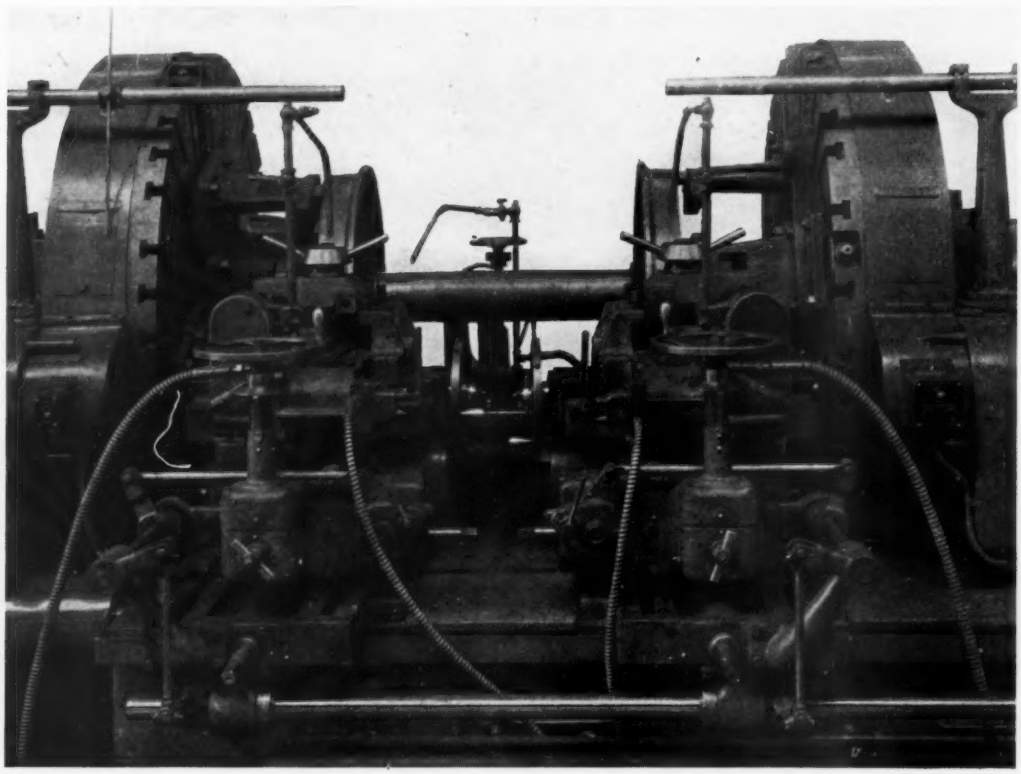
Two front compound slide rests with quick-acting pneumatically-operated tool clamps, are mounted on rigid saddles, with longitudinal and transverse adjustments. Longitudinal and transverse feed in both directions is provided to the tool slides through enclosed ratchet feed gear, from a rocking shaft at the front of the bed. The tool slides are made from steel castings, with wearing strips on the undersides. An intermediate slide is provided for swivelling the rests to turn the taper required, and thus the transverse adjustment is maintained at right angles to the axis of the lathe, while the longitudinal feed is set to the angle required. There are direct-reading scales for measurement of wheel diameters. Taper plugs fitting in drilled holes are provided for setting the swivel rests in position for turning the tread of the tyre, and for parallel turning. Hand adjustments are provided, with ball thrust washers on the screws.



Journal re-turning and burnishing attachment and its drive

Each rest is arranged for tyre turning comprising the following tools: Tread roughing and combined flange roughing, forming, chamfering, and inside facing tool, each of which is simultaneously gripped under the pneumatic clamp. The flange topping tool is held in position by set screws on the rest. The combined flange-and-tread finishing profile form tool is fixed in a removable toolholder, which fits into a T-slot on the top rest. An additional toolholder is provided for turning the outer face of the tyre, and for machining the limit groove in the tyre.

The variable self-acting feed motion is of the positive intermittent type, to traverse the tool slides longitudinally



Close-up view of front rests, faceplates, and drivers

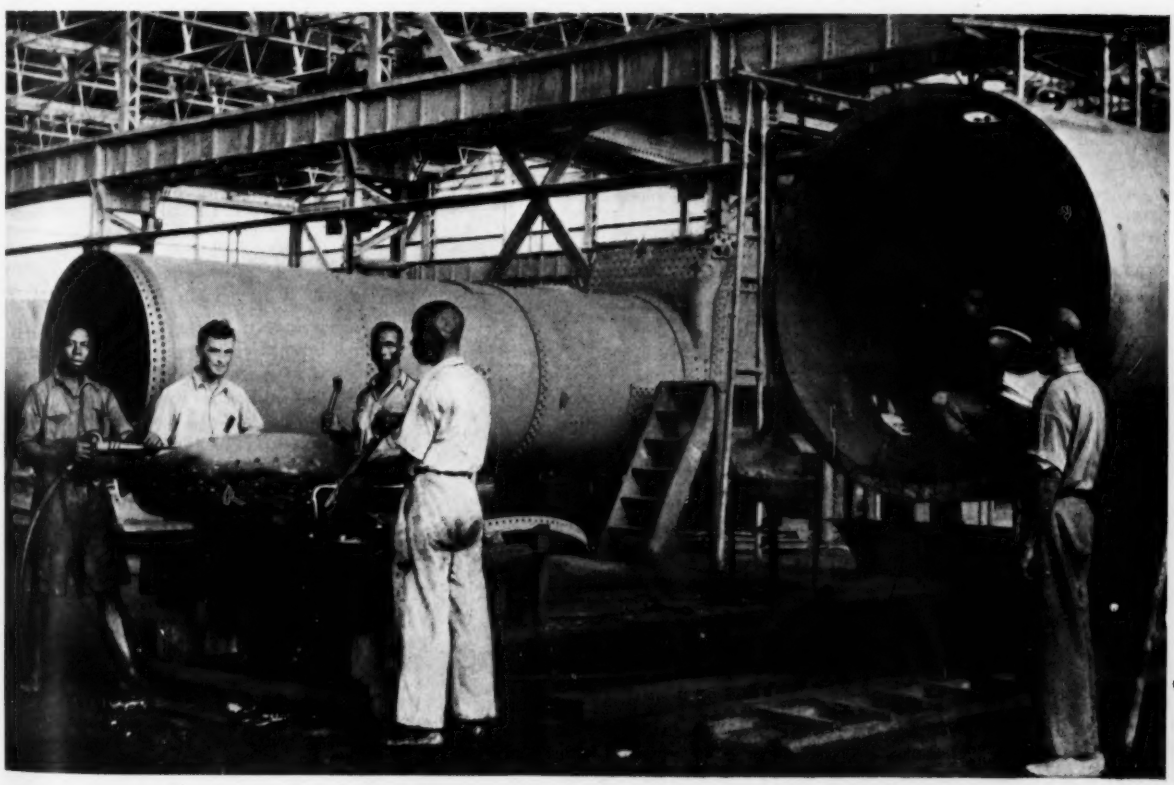
and transversely together or separately in either direction. The feed motion is driven from the main shaft in the bed through two-change feed box with connections to the rests by longitudinal shaft, through connecting rods, levers, and enclosed ratchet feed gear. The lathe is fitted with an adjustable pin gauge for calipering, carried from a bar supported by brackets on headstocks clear of the vertical centre to allow the wheel-sets to be lifted into and out of the lathe by the overhead crane without interference. All the controls for operating the lathe when the wheel-sets are in position for turning are within easy reach of the operator, and the push buttons are mounted on a stand close to the rests. All the gearing is of ample strength, machine cut; the faceplate rings and larger spur gears are made from iron castings, and the smaller wheels and pinions from high-tensile steel blanks. The levers for controlling the main driving gear are at the front of the lathe and readily accessible. The main driving shaft bearings are bushed with gun-metal, but not the feed shaft bearings.

Special attention has been paid to the lubrication of the lathe, which is, as far as possible, centralised. Where it is not practicable to lubricate by this system, oiling nipples are fitted for use with an oil gun which is provided with the lathe. The gears in the change-speed boxes run in oil baths, and the main spindles and driving shafts have automatic lubrication. A substantial control platform for the operator will be provided.

The back rest consists of a lighthouse rest, mounted on a saddle and auxiliary bed; the auxiliary bed is mounted at the back of the wheel lathe bed. The tool rest has variable self-acting cross traverse for boss facing and longitudinal traverse for journal re-turning, with continuous feed. The feed is through a four-speed gearbox attached to the side of the bed, and the box is driven from the special drive for journal re-turning, through gearing and a longitudinal shaft.

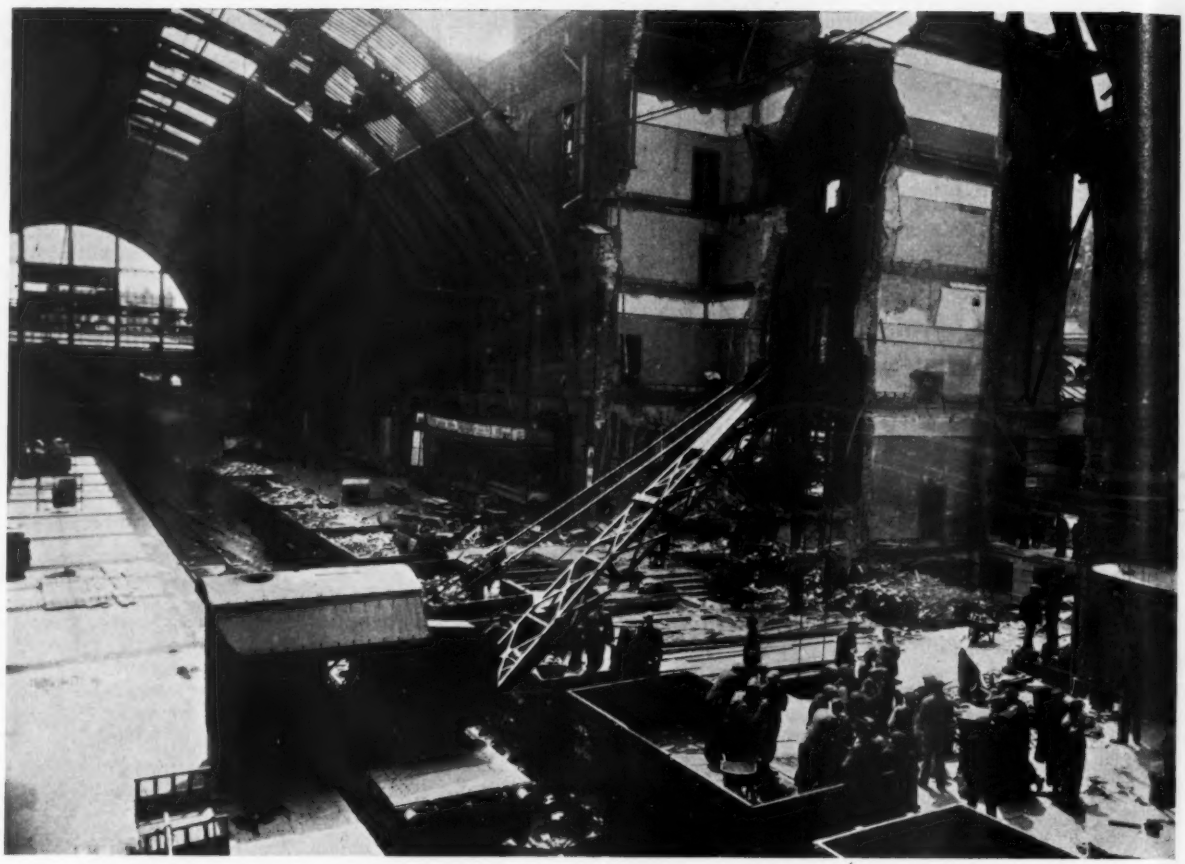
In the special drive for journal turning the drive to the wheels is by a 5 b.h.p. vertical flange-mounted constant-speed motor directly connected to a worm reduction unit, through a six-speed gearbox and spur gears, to a driving shaft mounted on a special adjustable rocker frame, supported by rackets on baseplate. The final drive is by belt from a pulley mounted on the driving shaft, to the tread of one of the tyres; the driving tension is applied to the belt by worm and quadrant operated by a hand wheel, with locking device, to suit wheels of all diameters within the specified range. The driving pulley is provided with a small amount of side adjustment, to enable it to be brought into line with the tread of the wheel. When re-turning journals, the wheels are disengaged from the faceplate drivers, the drive being by separate belt as above described. After one journal has been machined it is necessary to turn the lighthouse rest round 180 deg. and traverse the slides along the bed to deal with the second journal. The gearbox is totally enclosed and the other gears are suitably guarded. Two double roller burnishers are provided to suit journals ranging from $4\frac{3}{4}$ in. to $6\frac{1}{4}$ in. and $6\frac{1}{2}$ in. to $8\frac{1}{2}$ in. diameter. The feed gear shaft is driven from the output shaft of the worm gear unit, through slip gears, two sets being provided.

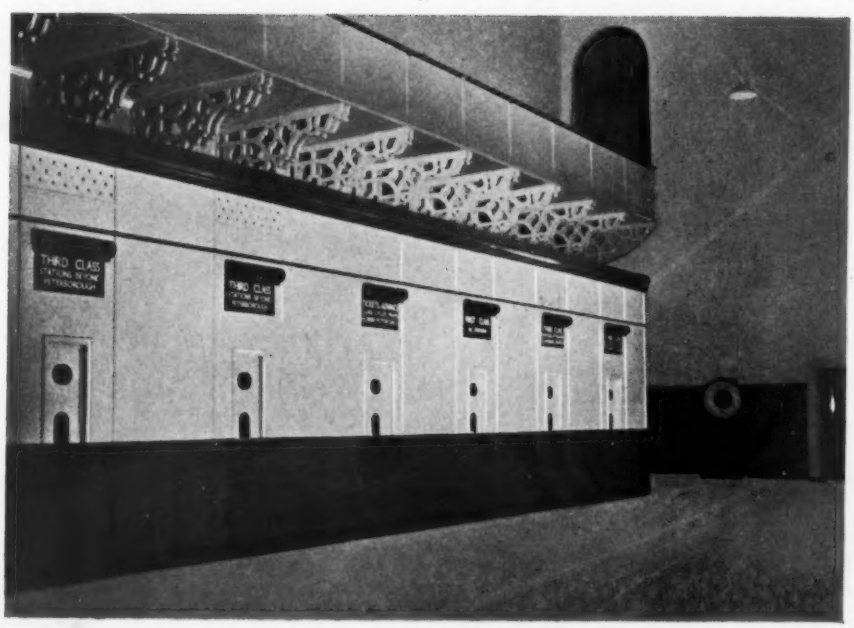
African Workers in Nigerian Railway Workshops



Hundreds of Africans are trained in the Nigerian railway workshops, and some are shown above in a corner of the boiler shop. The claims of railway workers in Nigeria have been attracting attention lately and were the subject of statements by Mr. George Hall, Under-Secretary of State for the Colonies in the House of Commons recently (reported in our issue of December 19 & 26 at page 677)

British Railways and the War—100





Above: View showing the bomb damage sustained in the early part of last year by the buildings adjoining No. 10 platform at King's Cross Station, L.N.E.R. The main-line booking office was demolished

Left: The main-line booking hall after repair; it was reopened on November 17 last. Further reference to the air raid damage at King's Cross Station was made at page 565 of our November 28 issue

RAILWAY NEWS SECTION

PERSONAL

Among the Commissions signed by the Lord Lieutenant of the County Palatine of Chester is that of Honorary Captain Sir Percy Elly Bates, Bt., G.B.E., J.P., R.N.R., of Hinderton Hall, Neston, Wirral, a Director of the Great Western Railway Company, to be a Deputy Lieutenant.

INDIAN RAILWAY STAFF CHANGES

Mr. T. G. R. Eagan, Officiating Deputy Chief Engineer, N.W.R., has been appointed Deputy General Manager (Recruiting) on that system as from September 11, 1941.

Mr. F. J. de Souza has been appointed to officiate as Deputy Chief Engineer in place of Mr. Eagan.

Mr. W. E. Gelson, Research Officer, has been appointed to officiate as Deputy Chief Controller of Standardisation (Civil Engineering), Railway Board, as from September 16, 1941.

Mr. R. E. Rutherford, Divisional Superintendent, E.I.R., has been granted 19 months' leave preparatory to retirement, as from October 18, 1941.

Mr. Walter S. Thompson has been appointed Director of Public Relations, Canadian National Railways. Mr. Thompson will continue to have jurisdiction over the general publicity and advertising of all departments of the system, in addition to other duties assigned to him. After a newspaper career in the United Kingdom and Australia, Mr. Thompson went to Canada about 25 years ago, and joined the Montreal *Daily Witness* as a reporter. He became successively Assistant City Editor of Montreal *Daily Telegraph* and City Editor of Montreal *Herald*, prior to accepting a post as Publicity Officer of the Grand Trunk Railway which has developed into his present position. Mr. Thompson, who is of Scottish descent, is a native of Newcastle-on-Tyne.

The Platinum Medal of the Institute of Metals for 1942 has been awarded to Mr. W. Murray Morrison, Vice-Chairman & Managing Director of the British Aluminium Co. Ltd., in recognition of his outstanding services to the non-ferrous metals industries.

Mr. Patrick McNamara, District Superintendent, Great Southern Railways, Broadstone District, retired on December 31, 1941. Mr. McNamara has been succeeded by Mr. Thomas Francis O'Doherty, Stationmaster at Westland Row (Dublin). Coincident with Mr. McNamara's retirement, the headquarters of the District has been changed to Mullingar. Mr. McNamara joined the service of the former Waterford, Limerick & Western Company in 1892, and acquired considerable station experience before being promoted to the office of the Superintendent of the Line of the Great Southern & Western Railway in 1903. He eventually reached the position of Chief Trains Clerk, which he retained after the amalgamation of the Irish railways until he was appointed District Superintendent at Broadstone in 1933.

Mr. H. G. Fish, District Locomotive Superintendent, Norwich, L.N.E.R., who, as recorded in our issue of January 30, has been appointed District Locomotive Superintendent at Colwick, joined the Great Northern Railway in 1902 as a Premium Apprentice at Doncaster Works, and passed through the various shops and the drawing office. On completion of his apprenticeship in 1907 he was stationed at Doncaster Sheds where he dealt with running repairs and gained footplate experience. From 1908 to 1914 he was Assistant Running Shed Foreman at Doncaster, Carriage Locomotive Shed, and during 1914 he was Foreman at Colwick

Mr. H. G. Fish

Appointed District Locomotive Superintendent, Colwick, L.N.E.R.

Locomotive Depot. In the same year he was transferred to take charge of York Shed as Assistant to the District Locomotive Superintendent, Doncaster. After war service as an officer in the Railway Operating Department, Royal Engineers, he became Assistant to the District Locomotive Superintendent, Peterborough, in charge of Boston Shed. From 1924 to 1927 Mr. Fish was Locomotive Depot Superintendent, Mexborough; he became Assistant District Locomotive Superintendent, Peterborough, and transferred in 1932 to the corresponding position at Doncaster, which he held until 1935. He was then appointed District Locomotive Superintendent, at Norwich, which position he held until his present appointment at Colwick.

We regret to record the death on September 4 of Mr. E. A. Evans, former Commissioner of the Western Australian Government Railways, at the age of 76. Mr. Evans was born at Worcester, England, in 1865, and was educated at the Queen Elizabeth Grammar School, Worcester. On leaving school, he served articles as an apprentice with Messrs. McKenzie & Holland, mechanical engineers, whose interlocking system is widely known throughout the railways of the British Empire. After his apprenticeship was completed, he remained with the firm for five years. In 1890 he secured an appointment as Interlocking Engineer with the New South Wales Government Railways, but resigned six years later to re-enter the service of his old firm as its representative in Western Australia. In this capacity he carried out a considerable amount of signalling work under contract with the Western Australian Government. In September, 1896, he was appointed Interlocking Engineer to the railway, was later made Locomotive Manager, and in 1903 became Workshops Manager. When the office of Chief Mechanical Engineer became vacant in 1920, Mr. Evans was selected to fill it on account of his intimate knowledge of the department's requirements and his wide experience. For some years, in addition to his other duties, he had charge of all railway cases in the Arbitration Court, and in the two or three years before ill-health caused the retirement of Colonel H. Pope from the post of Commissioner of Railways, he relieved Colonel Pope for extended periods. When the latter resigned Mr. Evans became Commissioner, and took office on January 1, 1929. He retired in December, 1933.

We regret to record the sudden death on February 1 of Mr. Tom Durnan, Sales Manager of the Railway Department of the Laycock Engineering Co. Ltd., of Sheffield. He had been connected with the company all his life and will be remembered by many as being closely associated with the late Mr. W. S. Laycock from the inception of the business.

The death on September 6, at the age of 56, of Mr. Henry A. Green, Managing Director of Murex Limited, was recorded by the Chairman (Mr. George P. Joseph) at the recent ordinary general meeting of the company. Mr. Green became connected with the original company in 1909, and in 1913, when that company was reconstructed, he was appointed General Manager of the newly-formed Murex Co. Ltd. Further reconstruction was carried through in 1920, when the present company, Murex Limited, was formed, and Mr. Green became General Manager. He was appointed Managing Director in 1934. Mr. Joseph said that the important position now held by the company was due very substantially to Mr. Green's energy and initiative.

Mr. A. C. Cookson, whose death on January 24 was recorded in our issue of January 30, was born on November 11, 1868. He was educated at Rossall School, where he obtained the principal mathematical scholarship, and he afterwards gained the Rossall School scholarship at the City and Guilds of London Central Technical College, now one of the constituent colleges of the Imperial College of Science and Technology, and in 1888 he gained the diploma of the college (A.C.G.I.), and subsequently was elected a Fellow. He acquired his early engineering training at the works of J. & G. Rennie, of Blackfriars, and in 1891 joined the firm of Joseph Westwood, of Millwall, bridge and constructional steel engineers. In December, 1894, Mr. Cookson entered the service of the Great Western Railway

as a surveyor and draughtsman on the staff of the new works section of the Chief Engineer's office, and in 1901 was appointed assistant. From October, 1901, to July, 1907, he was successively appointed Resident Engineer on the construction of new railways between Acton and Wycombe, between Clarbeston Road and Letterston, and those known as the Swansea District Lines. Mr. Cookson was appointed Chief Assistant to the Divisional Engineer at Gloucester in January, 1911, and in July, 1916, he became Steelwork and General Assistant to the Chief Engineer. In May, 1924, he was appointed Assistant Stores Superintendent at Swindon and he became Stores Superintendent in May, 1927, the position he held until his retirement in 1936. In 1933-34 he was Chairman of the Stores Superintendents' Committee of the R.C.H., was President of the Railway

The late Mr. A. C. Cookson, F.C.G.I.

Stores Superintendent, Great Western Railway, 1927-36

Assistant Engineers' Association for 1935, and was also a Member of the Institution of Civil Engineers. Mr. Cookson was for some years a lecturer on "Railway Engineering" at University College, London.

At the funeral at Golders Green Crematorium on January 28 the mourners included :—

Relatives and friends

Mr. E. C. Cookson, Mr. R. T. C. Cookson, Dr. W. Dickson, Miss Cookson, Mrs. John Evans, Sir Felix J. C. Pole.

Great Western Railway

Messrs. S. B. Taylor (Assistant to the Secretary, representing the Chairman and Directors, Sir James Milne, General Manager, and Mr. F. R. E. Davis, Secretary, and their staff), A. S. Quartermaine (Chief Engineer), G. F. Boxall (Stores Superintendent), F. H. D. Page (Signal Engineer), R. C. Y. Kirkpatrick (London Divisional Engineer), G. R. G. Sargent (Steelwork Assistant to the Chief Engineer), A. E. C. Dent (Motor Assistant to the Superintendent of Road Transport), A. S. Mills (representing the Retired Railway Officers' Association).

Lt.-Colonel Harold Rudgard, R.E. (Retired), M.I.L.E., M.Inst.T., A.M.I.M.E., Divisional Superintendent of Operation, L.M.S.R., Derby, who had to undergo an operation on New Year's Eve, is now convalescent and hopes to resume duty in the near future.

Funeral of Mr. Frank Potter

FUNERAL AT LANE END

The funeral of Mr. Frank Rowe Potter (Superintendent of the Line, Great Western Railway, 1936–1940), whose death on January 23 was recorded in last week's issue, took place at Lane End Parish Church, High Wycombe, on Tuesday morning, January 27. The bearers were : Chief Inspector Partridge ; Chief Ticket Inspector Wheatley ; Chief Divisional Inspector Langston ; District Inspector Sweetzer ; District Inspector Harvey ; Guard Hurley ; Guard Pavey ; Guard Jones.

The mourners attending the Lane End funeral service included :—

Family

Miss Potter, Mr. and Mrs. J. E. Potter (represented by Mr. J. F. M. Taylor), Lt.-Commander R. H. Whittington, Mr. R. A. Whittington, Miss D. Yates.

Great Western Railway

Messrs. Gilbert Matthews, G. Orton (at organ), E. A. Glayzer, W. R. Charlton, A. Maynard, S. B. Taylor (representing Mr. F. R. E. Davis), P. W. Pine, H. L. Wilkinson, Walsham Morris (representing Mr. C. R. Dashwood and West Middlesex R.A. Chapter), A. S. Quartermaine, F. H. D. Page, W. N. Pellow (representing Mr. F. W. Hawksworth), Geo. Stephens, W. E. Hart, F. G. Wainwright, R. L. Baker (representing G.W.R. (London) Dramatic Society), P. Grumbridge, H. Colbourn, Mr. Ash, Goods Agent, High Wycombe.

Others Present

Sir Felix Pole, Messrs. J. E. T. Stanbra (Secretary, Railway Clearing House), F. J. C. Piper, A. J. Foale, J. A. Kay (THE RAILWAY GAZETTE), R. S. Griffiths (Westinghouse Brake & Signal Co. Ltd.), P. Clews (Canadian National Railways), Mrs. H. L. Wilkinson, Messrs. E. Huskisson (Thos. Cook & Son Ltd.), P. Wharton (Coast Lines Limited), J. Clubley Armstrong (Mizpah Lodge).

MEMORIAL SERVICE AT PADDINGTON

At 2.30 p.m. on the same day a Memorial Service was held at the Parish Church of Paddington, St. James, Sussex Gardens, and included an address by Dr. Wilkinson Riddle.

The mourners included :—

Great Western Railway

Sir James Milne, Messrs. K. W. C. Grand, F. R. E. Davis, A. S. Quartermaine and R. C. Y. Kirkpatrick (represented by A. V. Williams), C. R. Dashwood, P. W. Pine (represented by Mr. Southcombe), Gilbert Matthews, F. C. A. Coventry, Sir Ralph Cope, Messrs. H. H. Cavendish Fuller, R. A. P. Setterfield, H. J. Peacock, S. C. Hearn, G. E. Orton (at the organ), E. A. Glayzer, H. H. Swift, G. Dyall, A. H. Bird, F. W. Lampitt, C. Furber, G. Cornish, W. H. E. Humphrey, W. A. Lambert, C. T. Cox, Trevor Roberts, P. G. Robinson, F. Sealey, J. R. C. Williams, C. E. W. Powell, P. Cambridge, J. H. Parker, W. N. Pellow, C. Needham, H. R. Campfield, A. S. Mills, A. E. Bryant, Miss Robinson (representing Mr. and Mrs. E. Robinson), Messrs. S. A. Pope, J. W. Lovejoy, H. Wheeler, J. F. Britton, G. J. Walker, J. Pope, A. W. Arthurton, P. Frampton.

Government Officers and Other Railways

Lt.-Colonel Sir Alan Mount (representing Ministry of War Transport), Commander Whitworth (representing the Admiralty), Captain Sir Alfred Slade (representing Movement Control), Messrs. H. E. O. Wheeler (Southern Railway), T. E. Argile, H. E. Horne W. A. Stanier (L.M.S.R.), (represented by Mr. S. Purves), C. J. Selway (Railway Executive Committee), J. Worrell (L.M.S.R.), V. M. Barrington Ward (L.N.E.R. and Railway Executive Committee), Evan Evans (L.P.T.B.), A. B. B. Valentine (L.P.T.B.), Walter Smith (L.P.T.B. and Railway Convalescent Homes), R. M. T. Richards (Southern Railway) (represented by J. L. Randell), J. F. Bradford (President, Retired Railway Officers Society).

Other Mourners

Messrs. Cyril Williams (Mizpah Chapter), J. J. V. Taylor (Mizpah Lodge and Mizpah Chapter), F. Theakston (Mizpah Lodge), R. Fielder (Mizpah Lodge), T. Jolly (Pittshanger Lodge), E. L. Stroud (West Middlesex Chapter), F. W. Elsbury (West Middlesex Chapter), L. J. Stroud (West Middlesex Chapter), D. Draycott (West Middlesex Chapter), L. E. Rhodes (French Line), R. Bezant (*News of the World*), R. Lake (Lever Bros. & Unilever Ltd.), F. Smith (Lever Bros. & Unilever Ltd.), R. H. Russell (Cunard White Star Line), W. H. Gaunt (J. Lyons & Co. Ltd.), S. H. James (Messrs. Pickfords), E. Huskisson (Thos. Cook & Son Ltd.), L. N. Veltom (W. H. Smith & Son Ltd.), J. A. Kay (THE RAILWAY GAZETTE), D. Hyne Jones (Clifford S. Snell), R. Laing (Union Castle), W. Cleaver (Associated Equipment Co. Ltd.), E. H. Greenly (Associated Equipment Co. Ltd.), W. H. Ruxton (Cunard Line), F. E. Bluff (Griffiths Millington Limited), Colonel P. M. Brooke-Hitching, Mrs. Wiggington, Mrs. A. S. Quartermaine, Mrs. J. A. Kay, Messrs. Charles Gardiner, David Richards, W. H. Dunkin, D. Mackinnon.

Mr. Frederick Porter Fausset, M.A., LL.B., Barrister-at-Law, whose death on January 12, at the age of 64, we recorded

The late Mr. F. Porter Fausset

Barrister-at-Law, and contributor on Railway Law to THE RAILWAY GAZETTE

in our January 16 issue, was born on May 18, 1877. He was a son of the Rev. A. R. Fausset, D.D., Canon of York, was educated at St. Peter's School, York, and was afterwards a scholar of Peterhouse, Cambridge. He was called to the Bar at the Inner Temple in January, 1902, and for many years was associated with the Council of Law Reporters. He was a member of the North-Eastern Circuit and was a special pleader. During the war of 1914-19, Mr. Porter Fausset was for a time in the Censor's office. Later he served in the legal department of the Underground Electric Railways Co. of London Ltd. He specialised in legal topics relating to transport, and for many years past has contributed to the columns of THE RAILWAY GAZETTE the feature entitled "The Month's Railway Law" and "Railway Law for the Quarter." He was the author of several legal works, chiefly for students.

Mr. William Harty, Chairman of the Canadian Locomotive Co. Ltd., Kingston, Ontario, has been elected Executive Vice-President of the Canadian Car & Foundry Co. Ltd., Montreal, and took up his duties on January 5. Mr. Harty will retain the Chairmanship of the Canadian Locomotive Company.

TRANSPORT SERVICES AND THE WAR—126

The ban on coastal area visits—Railways and the blackout —Continental train service reductions — Supplies for Russia through Persia—The Singapore-Johore Causeway

Last autumn members of the public were warned that it was intended that the restrictions on visits to the coast between the Wash and the Thames, and between Hastings and Littlehampton, which were temporarily suspended for the winter months, would be reimposed by February 15. The Ministry of Home Security has now announced that it has been decided to postpone the reimposition of restrictions on admission to these areas until April 15. If circumstances so require, the relaxation of the ban may be cancelled at short notice before that date. The ban on visitors, and the restrictions on residence, remain in force in the areas at present covered by them, namely, the whole of Kent outside both the Metropolitan Police District and the neighbourhood of Sevenoaks and Tonbridge; the corner of Sussex to the East of Hastings; and the Isle of Wight.

LIST A

Area subject to the existing ban on visits :—

In Kent :

(*a*) The whole of the County except—
- (i) those parts within the Metropolitan Police District ;
- (ii) the Borough of Tunbridge Wells ;
- (iii) the Urban Districts of Orpington, Sevenoaks, Southborough, and Tonbridge ;
- (iv) the Rural Districts of Sevenoaks and Tonbridge.

In Sussex :

(*b*) The non-County Borough of Rye ; and in the Rural District of Battle the Parishes of Beckley ; Peasmarsh ; Udimore ; Icklesham ; Pett ; Iden ; Rye Foreign ; Playden ; East Guldeford ; St. Thomas-the-Apostle Winchelsea ; and Broomhill.

(*c*) The Isle of Wight.

LIST B

Areas to which the ban will be extended on or before April 15, 1942 :—

EASTERN REGION

In Norfolk :

The County Borough of Great Yarmouth ;
The Non-County Borough of King's Lynn ;
The Urban Districts of Cromer, New Hunstanton, North Walsham, Sheringham & Wells-next-the-Sea ;
Freebridge Lynn Rural District : the parishes of Bawsey, Congham, Castle Rising, Flitcham cum Appleton, Grimston, Hillington, Leziate, Middleton, North Runcton, North Wootton, Roydon, Sandringham, South Wootton, West Winch ;
Docking Rural District excluding the parishes of Bagthorpe with Barmer, Barwick, Bircham, East Rudham, Houghton, South Creake, Syderstone, and West Rudham ;
Walsingham Rural District : the parishes of Binham, Blakeney, Brinton, Field Dalling Great Walsingham, Gunthorpe, Hindringham, Holkham, Langham, Little Walsingham, Morston, Stiffkey, Warham, Wighton, Wiveton ;
Erpingham Rural District, excluding the parishes of Corpusty and Itteringham ;
Smallburgh Rural District, excluding the parishes of Ashmanhaugh, Horning, Hoveton, Neatishead, Scottow, Skeyton, Sloley, Swanton Abbot, Tunstead & Westwick ;
Blofield and Flegg Rural District : the parishes of Ashby with Oby, East Caister, Filby, Flaggburgh, Freethorpe, Halvergate, Hemsby, Martham, Mautby, Ormsby St. Margaret's with Scratby, Ormsby St. Michael, Reedham, Repps with Bastwick, Rollesby, Somerton, Stokesby with Herringby, Thurne, West Caister, Winterton ;
Lodden Rural District : the parishes of Aldesby, Burgh St. Peter, Haddiscoe, Wheatacre.

In Suffolk :

Non-County Boroughs of Aldeburgh, Lowestoft, Southwold ;
Urban District of Felixstowe, Leiston cum Sizewell, Saxmundham ;
Wainford Rural District : the parishes of Blyford, Brampton, Elough, North Cove, Sotterley, Sotherton, Stovan, Willingham, Worlingham ;
Lothingland Rural District ;
Blyth Rural District : the parishes of Aldringham with Thorpe, Benhall, Blythburgh, Darsham, Dunwich, Farnham, Friston, Kelsale, Knodishall, Middleton, Snape, Sternfield, Theberton, Thorington, Walberswick, Wenhaston, Westleton ;
Deben Rural District : the parishes of Alderton, Bawdsey, Boyton, Brightwell, Bucklesham, Butley, Capel St. Andrew, Chillesford, Fakenham, Foxhall, Gedgrave, Havergate Island, Hemley, Hollesley, Iken, Kirton, Levington, Newbourne, Orford, Ramsholt, Shottisham, Stratton Hall, Sudbourne, Sutton, Trimley St. Martin, Trimley St. Mary, Tunstall, Wantisden, Waldringfield ;
Samford Rural District : the parishes of Chelmondiston, Erwarton, Harkstead, Holbrook, Shotley, Woolverstone.

In Essex :

County Borough of Southend ;
Non-County Boroughs of Harwich and Maldon ;
Urban Districts of Benfleet, Brightlingsea, Burnham-on-Crouc , Canvey Island, Clacton, Frinton & Walton, Rayleigh, West Mersea ;
Tendring Rural District : the parishes of Alresford, Beaumont cum Moze, Fratting, Great Bentley, Great Oakley, Little Clacton, Little Oakley, Ramsey, St. Osyth, Tendring Thorpe le Soken, Thorrington, Weeley, Wix, Wrabness ;
Lexden and Winstree Rural District : the parishes of Abberton, East Donyland, East Mersea, Fingringhoe, Great Wigborough, Langenhoe, Layer Breton, Layer de la Haye, Layer Marney, Little Wigborough, Peldon, Salcott, Tiptree, Virley ;
Maldon Rural District ;
Rochford Rural District.

SOUTH-EASTERN REGION

In Sussex :

County Boroughs of Hastings, Brighton, and Eastbourne.
Non-County Boroughs of Bexhill, Hove, Lewes, Worthing, and Arundel.
Urban Districts of Seaford, Newhaven, Portslade, Southwick, Shoreham-by-Sea, Littlehampton, and Burgess Hill.
Rural Districts of Hailsham, Chailey, Chanctonbury, and Worthing, and the remainder of the Rural District of Battle.
In the Rural District of Uckfield : the Parishes of Isfield, Little Horsted, and Framfield ;
In the Rural District of Cuckfield : the Parishes of Twineham, Albourne, Hurstpierpoint, Clayton, Keymer, Newtimber, Pyecombe, Poynings, and Fulking ;
In the Rural District of Chichester : the Parishes of Tortington, Ford, and Climping.

A leaflet has been issued by the Ministry of Home Security giving guidance on the restrictions. Copies have been sent to the police and to local authorities in the areas concerned, and to railway companies, bus undertakings, and Citizens' Advice Bureaux. The following notes, extracted from the leaflet by permission of the Ministry of Home Security, set out the position so far as it affects public transport. It is not the responsibility of any railway or bus undertaking to enquire into the motives of intending travellers, but the operators are co-operating with the police and other authorities in giving warning of, and guidance concerning, the regulations.

TYPES OF VISITS NOT PERMITTED.—The ban prohibits persons from entering the restricted areas for the purpose of a holiday, recreation, or pleasure, or as a casual wayfarer. It also prohibits visits for health reasons or for the purpose of convalescence even though the person concerned may intend to visit a convalescent home or nursing home in the area.

TYPES OF VISITS PERMITTED.—The ban does not apply to persons ordinarily resident in the area concerned or to persons entering for business reasons. Similarly, the ban does not apply to persons crossing restricted areas in order to reach an unrestricted area. The following types of visits would be allowed under these headings :

(*a*) Visits on business connected with a person's employment or occupation.

(*b*) Visits connected with the essential care and maintenance of premises owned by the person concerned.

(*c*) Visits to parents, children, wives, or husbands.

(*d*) Visits for the wedding or for the funeral of a relative.

(*e*) Visits to near relatives who are seriously ill or aged (*i.e.*, over 70 years of age). The term *near relative* means a member of one's own immediate family (including grandparents) and uncles and aunts but not cousins.

(*f*) Visits to friends or relatives who are patients in a hospital or auxiliary hospital under the Emergency Hospitals Scheme or a sanatorium.

INVALIDS.—Patients intending to enter any hospitals or auxiliary hospitals under the Emergency Hospitals Scheme, under arrangements made in the operation of that scheme, and tubercular patients intending to enter sanatoria, will be permitted to enter the area. Visits to all other convalescent homes and nursing homes are prohibited by the ban however.

ALIENS.—Aliens who have not been specially exempted from the Aliens (Protected Areas) Orders may not enter any of the areas for any purpose whatever without having first obtained the permission of the Chief Constable for the area.

NO PERMITS.—No permits are issued. Members of the public who propose to visit any of the areas may be called upon to satisfy the local police that the object of their visit falls within one of the permitted categories. For this purpose, they would be well advised to carry with them some evidence in writing of the purpose of their visit.

PERMANENT RESIDENCE.—Anyone who has not resided in the restricted areas enumerated in List A for an aggregate period of at least six months since January 1, 1939, is not allowed to take up residence in the area unless he is doing so for the purpose of

- (i) Business or employment ;
- (ii) Acting as housekeeper to, or taking care of, a near relative ; or
- (iii) Staying with friends or near relatives in certain parts of the area, provided that he possesses an official certificate from a local authority that he has been rendered homeless or has left his home as a result of air attack.

Anyone contemplating continued residence in one of these areas should secure police permission in advance.

When the restrictions on visits are extended to the areas enumerated in List B, a similar restriction will be imposed on permanent residence. This restriction will apply to all persons who enter these areas after November 14, 1941. Any person contemplating continued residence in one of these additional areas should, therefore, in his own interests at once notify the police in the area giving the reasons why he wishes to reside there. He will then be told whether he will be allowed to remain.

Ultra Violet Rays Speed War Freights

The use of ultra violet rays and a special type of fluorescent chalk is expediting the handling of war freights at L.M.S.R. marshalling yards throughout the country. Obviously, the blackout slows work on the railway, even though a certain amount of lighting is permitted to assist operations, and the work of breaking up and reforming freight trains in marshalling yards is one of the activities chiefly affected by lack of lighting. The principal difficulty has been

the inability of reading the chalk numbers placed on the wagons to indicate to the shunter into which siding the wagon has to be placed, but experiments conducted by the L.M.S.R. have resulted in this particular difficulty being overcome. Recently an important L.M.S.R. marshalling yard was equipped with ultra violet ray lighting, the beam of which is directed down the hump over which the wagons are shunted. The wagons are marked with a special type of fluorescent chalk, and the action of the ultra violet ray on this activates its fluorescent properties and results in the numbers glowing while the wagon is in the ray, thus enabling the shunter readily to read the number and shunt the wagon into the right siding. The experiments have proved so successful that the use of ultra violet rays and fluorescent chalk is being extended to other yards where difficulties exist in reading chalk numbers.

L.N.E.R. "Later Blackout" Suburban Services

Due to the later hour of blackout and the absence of the intensive air raiding conditions that prevailed last winter, business travel from London between 4 p.m. and 5 p.m. is declining, and the L.N.E.R. therefore introduced "later blackout" suburban services on Monday last, February 2.

Smaller L.N.E.R. Suburban Timetable

The new timetable for the L.N.E.R. services to and from King's Cross as from February 2 is printed in smaller type, which, together with other improvements, has enabled the number of pages to be reduced from 56 to 20, thereby saving 1½ cwt. of paper an issue.

Manchester Inter-Station Buses for the Forces

Subject to the approval of the railway authorities, the Manchester Corporation Transport Committee decided on January 27 to run a regular daily bus service between London Road and Victoria Stations for the use of uniformed members of the Forces with kit or baggage. At present, members of the Forces with luggage experience great difficulty in travelling between the stations by bus or tram. It is proposed that the new service, for which some nominal charge will be made, shall operate between 2 p.m. and 9.30 p.m.

Basic Fuel Rations Discontinued

The issue of basic fuel rations for motor goods vehicles is to be discontinued from March 7 next, the first day of the new rationing period. At present, operators of goods vehicles receive a basic ration related to the unladen weight of the vehicle, and supplementary rations are issued when additional fuel is shown to be necessary for essential work. After March 7 issues will be made only when justified by the kind of work performed. This will enable the Government to exercise complete control over the fuel consumption of commercial vehicles. The decision will also provide an additional incentive to retail traders, who form the bulk of the operators now running on basic rations, to proceed as quickly as possible with their schemes for "rationalising" deliveries. These schemes should be in operation by the time the change is made and any trader who refuses or omits to join a local scheme may be refused fuel.

Air Losses

The following figures, compiled and issued by the British Air Ministry, cover air losses in the war up to December 31, 1941, as the result of combat between the R.A.F. and the enemy :—

	Axis	R.A.F.
Over and round Great Britain	3,692	887
Over Europe	940	1,875
Middle East	2,875	711
Western Front	957	379
Scandinavian Front	56	55
At sea	39	54
Russia	15	1
Grand totals	8,574	3,962

Our contemporary, *The Aeroplane*, points out, however, that the Air Ministry figures do not give a true comparison, because those for Axis losses include aeroplanes destroyed on the ground, whereas the figures for the R.A.F. do not. The figures for the Axis do not include the aeroplanes shot down by the Navy and Fleet Air Arm. With these adjustments made, the comparative figures up to December 31, 1941, are : Total Axis losses, 7,767 ; total R.A.F. losses, 3,962. We would add that all these figures must be regarded as minimum ascertained losses. It is well known that Air Ministry official figures are substantially below the probable actual figures, due to the care which is exercised in requiring confirmation before an enemy loss is claimed.

Exodus from Calcutta

The number of persons leaving Calcutta by the East Indian Railway between December 13 and January 20 reached 600,000, compared with 250,000 in normal times. The railway administrations have prepared a precautionary joint scheme for evacuation which would permit of 100,000 persons leaving daily should this prove necessary.

Train Travel Restriction in India

A "travel-less-by-train" campaign is to be launched by the Indian railways to prepare for further restriction of passenger train services in order that vital war traffic may move uninterruptedly. The passenger train service has already been reduced by about 10 per cent. of the normal, as compared with a maximum average of 25 per cent. in the last war. Compared with the year before the present war, 16 per cent. more passengers and 30 per cent. more goods are being carried by the railways. In the nine months ended December, 1941, as many as 1,974 special trains were run for troops, prisoners of war, supplies, equipment, and so forth, according to advices from New Delhi.

Wartime Railway Abandonment in the U.S.A.

Although during the 9-year period from 1932 to 1940 (inclusive) no fewer than 14,808 route miles of railway have been abandoned in the U.S.A., the procedure for securing the necessary Government approval has been by no means rapid. Changes in procedure have been under consideration for some time, and their introduction on January 6, under new arrangements made by the Interstate Commerce Commission, is a direct result of the desire to speed up many of the smaller abandonments so that steel may be reclaimed for requirements of national defence. One of the important changes is that which permits the operating company to file the return to the questionnaire at the same time as the original application for abandonment. Another change includes permission for the operating company to supply passenger and freight statistics for only two years, instead of five years as heretofore ; there is a stipulation, however, that figures for five years will be supplied subsequently if required.

War Emergency Powers and U.S.A. Transport

Now that the United States of America is at war with Japan, Germany, and Italy, the President has become possessed of various additional emergency powers, one of which is that under Act of August 29, 1916, giving him authority to assume control of any system or systems of transport. Among the powers he previously had during the state of unlimited national emergency were those granted by the provisions of the Interstate Commerce Act which stipulated that the Interstate Commerce Commission, on the demand of the President, must establish priorities for transport of troops and shipments of war materials.

The threat of possible sabotage to the U.S.A. railways has impelled the railway companies to take extra precautions against damage.

The State Department has announced that Japanese civilians may not engage in movements which would require the use of aeroplane, train, ship, or bus. Personnel of railway ticket offices have received instructions not to sell tickets to Japanese persons until their status is classified.

Record Christmas Traffic on the C.N.R.

"Railway travel was on an unprecedented scale during the Christmas period and everything in the way of a previous record has been displaced by new figures," said Mr. C. W. Johnson, General Passenger Traffic Manager, Canadian National Railways, when recounting the unusual experiences of the railways during the days immediately preceding and Christmas Eve itself.

"We never before operated such a number of trains in extra sections nor so many trains with all accommodation completely occupied," continued Mr. Johnson, who added : "This was the experience on every line leaving and entering Montreal, and I am certain that Bonaventure station never before conducted such a large business in selling transportation. The same condition was observed at St. Catherine Street East station where extra sections have been operating for ten days previous to Christmas Eve. In the meanwhile large numbers of men of the armed forces travelling on furlough have been carried home from camps so that the total number of individuals using railway services has been greater than

ever previously reached. Naturally, figures are not available at the moment, but it is quite apparent that they will be of record character when finally assembled."

As an example of one day's traffic at Bonaventure inbound sleepers, coaches, and express cars numbered 387, and on the same day the outbound traffic required the use of 353 cars.

Complete Canadian Train for Express Traffic

An interesting commentary on the times was provided prior to Christmas when express traffic became so great as to necessitate assembling a complete train of laden express cars. Much of this business was of a commercial nature, but at least half of it was necessitated by the large number of parcels being sent as Christmas presents from Montreal to friends and families in Abitibi Chicoutimi, and the Lake St. John area.

Further Limitation of Motor Fuel in Italy

The supply of charcoal and wood for producer-gas-operated motor vehicles in Italy is rationed as from February 1, due to insufficient reserves and reduced imports.

Fewer Swiss Trains

The Swiss radio announced on January 28 that severe train restrictions are to be imposed, by reason of the shortage of lubricants and the need for conserving electric power for industrial purposes.

Train Service Reductions in Portugal

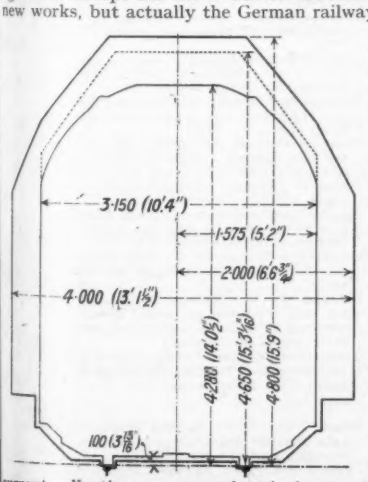
Reductions in train services due to coal shortage came into force throughout Portugal on January 27, only mail trains and a few passenger trains are now being run. Severe passenger-service curtailments on the Northern Railway of Spain, also due to coal shortage, were announced on January 16, as recorded at page 175 of our January 30 issue.

German Rail Traffic to Occupied Russia

The Reichsbahn has accepted freight and livestock for a number of stations in occupied Russia as from November 5, 1941, but permits must be obtained prior to despatch, and fresh waybills are required from the former German-Soviet frontier stations. The occupied Russian lines are operated by three divisions (*direktionen*), the Northern at Vilna, the Central at Minsk, and the Southern at Kiev.

German Structural Gauges

One result of the spread of the war to most of the European countries has been the wide public appreciation of the fact that by no means all European railways are built to the standard track gauge of 4 ft. 8½ in. References in the popular press, both accurate and inaccurate, have been made to the different standard gauges used in Russia (5 ft.), Spain (5 ft. 6 in.), Iraq, Persia, and so forth. Track, however, is not the only consideration with the interchange of rolling stock, but there is far less public appreciation of the importance of the structure gauge. Due to the antiquity of many of the British main lines, the structure gauge is smaller than any generally in use on the Continent, with the result that Continental stock could not operate over very large sections of the British railway systems. All the main European railways have agreed to accept the Berne Conference standard as a minimum for new works, but actually the German railways have used somewhat larger dimensions, as shown on the accompanying profile from Baurat Dr.-Ing. E. Metzeltin's book.* The outer profile shows the minimum fixed structure gauge prescribed by the German regulations of July 17, 1928. The inner profile is the maximum structural gauge of vehicles, or maximum moving dimensions, under the same regulations; but the higher gauge, shown dotted, is now generally permitted. Special regulations apply to the space between the rails on rack railways, and to the upper limits of current-collecting gear on electric locomotives. Below the lower horizontal profile, unsprung parts may project to within 70 mm. (2¾ in.) of the rail surface, while parts covered by the tyres, such as rail guards, brake shoes, and sanding pipes, may extend to within 50 mm. (2 in.) of the rail. Even when the tyres are worn, vehicles must be within the structural gauge in the mid-position on straight track. On curves of 250 m. (820 ft.) radius and over, the inclination of locomotives may bring them outside the structural gauge for vehicles, but they must not reach the minimum fixed structure gauge. The clearance to be provided is not prescribed. Corresponding reductions in width are therefore sometimes required.



* "Lokomotiven mit Antrieb durch Dampf, Druckluft, und Verbrennungsmotoren" (Steam, Compressed-Air, and Internal-Combustion-Engined Locomotives). See review in THE RAILWAY GAZETTE of December 1, 1933, page 811

German Freight Traffic Suspension

A press message from Zurich dated January 28 said that all commercial railway goods traffic in Germany is being stopped until further notice. All available wagons must be unloaded and reported. As we reported at page 175 of our January 30 issue, further drastic restrictions on civilian passenger traffic were introduced on January 18. It is probable that severe weather conditions have made it necessary to take these steps with commercial traffics in order to use reduced facilities entirely for war priority traffics.

Supplies for Russia through Persia

"Traffic from the Persian Gulf to the Caspian Sea has trebled since we began work, and we hope it will be doubled again by the spring," according to a statement by Brigadier Sir Godfrey Rhodes, Chief of the Transportation Directorate in Persia. Many locomotives from Great Britain and wagons from various parts of the world are already in service there. The goods carried are largely raw materials for the Russian war effort. The Russians are now entirely responsible for the two railway lines northwards from Tabriz to Zinjan and from Tabriz to Bandar Shah. A Commission representing Great Britain, Russia, and Persia has been formed to consider transport problems, and it is meeting every week. Brigadier Sir Godfrey Rhodes is the British member of the Commission. The other two are the Persian Minister of Roads & Communications (General Djahanbani), and the chief representative of the Russian Technical Mission (Mr. Kraevoie).

A British official spokesman has stated that the first task of the Persian railways is to supply the essential needs of Persia, and the second to supply war materials for the British and Russian Forces.

The Anglo-Soviet Treaty of Alliance with Persia was signed in Teheran on January 29. It provides, *inter alia*, that the Allied Powers (the United Kingdom and the U.S.S.R.) undertake to respect the territorial integrity, sovereignty, and political independence of Persia; that the Allied Powers undertake to defend Persia from all aggression on the part of Germany or any other Power; and that Allied Forces shall be withdrawn from Persia not later than six months after hostilities with the Axis Powers have been suspended by armistice, or on the conclusion of peace, whichever date is earlier.

Three Notes have been exchanged, the text of which are contained in three Annexes. Annexe No. 3 gives the assurance that no provision in the treaty requires the Persian Government to bear the cost of works carried out by the Allies which are not necessary for the needs of Persia.

The Singapore-Johore Causeway

The causeway connecting Singapore island with Johore, the nearest of the Malay States, has been very much in the war news during the last few days by reason of the fact that British troops have evacuated the Malay mainland, and have been withdrawn, under R.A.F. and Naval protection, across the causeway to Singapore Island; the withdrawal took place on January 30, and the Johore causeway was successfully breached. This causeway, which took four years to build, was begun in 1919 and opened to railway traffic on September 17, 1923. One of the objects for improving the means of transit between Singapore and the mainland was to help the increasing rubber traffic. The first suggestion was that a bridge should be constructed, but investigation showed that the foundations would not be satisfactory. The average depth of water at the point of crossing is 46 ft. at low tide, and in some places is as much as 75 ft. The suggestion to build a rubble causeway was eventually adopted as ample supplies of stone were available in the neighbourhood. The main objections to a causeway were sentimental ones to closing the Straits of Johore which had formed the old route for ships trading to the Far East. The method employed in constructung the causeway was to dump hundreds of thousands of barge-loads of granite, quarried in a nearby island, until a solid roadway was formed above water level; 1,600,000 cu. yd. of granite were required for the whole work. Along the top of the causeway, which is 3,465 ft, in length, run a metre-gauge railway, a 26-ft. road, and a water pipe-line supplying Singapore from the hills of Johore; Singapore is, however, not dependent upon this source of supply. As the causeway has closed the Straits of Johore, it became necessary to provide for the passage of small craft and, accordingly, a lock was built at the Johore end. The lock is 170 ft. long and 32 ft. broad, widening inside the gates to 45 ft. so that several craft can pass through at a time. It is provided with a double set of gates as, because of the tides, the flow of water through the lock changes in direction. An electrically-operated rolling lift bridge carries the railway and roadway across the lock; the weight of the moving part of the bridge is 570 tons.

Snow and the Railways

For the third successive winter of the war the British railways have had to perform their work hampered by extremely bad weather. In recent weeks there have been very heavy falls of snow in many parts, more particularly in the north.

Heavy snow fell practically throughout the whole of the L.N.E.R. system during the night of January 19-20. Points became blocked with frozen snow and a number of minor derailments of locomotives and wagons occurred; 10 engines were derailed in the Doncaster district alone. In Scotland at one time most of the L.N.E.R. lines north of Aberdeen were blocked at one place or another. The Aberdonian express from King's Cross had to be diverted *via* Perth and was many hours late on arrival. In the Aberdeen district two goods trains became buried in snow drifts and the military authorities afforded assistance in digging out the trains. A passenger train from Aberdeen ran into a drift a few miles south of Fraserburgh and passengers were unable to leave the train for some hours.

In the York district a train from Whitby to Scarborough became immobilised in a large drift between Ravenscar and Staintondale. Passengers were accommodated in the stationmaster's house nearby and in a local hotel while L.N.E.R. engineers and 100 soldiers dug the train out. The Scarborough—Bridlington line was also blocked and Scarborough—Hull trains had to be worked *via* Malton and Driffield. In the Wrexham district, drifts 6 to 8 ft. deep formed on the Neston—Upton line and also on the Wigan branch.

The blizzard which swept the country during the night of January 19-20 also caused widespread dislocation throughout the L.M.S.R. system. Effects of the storm were most severe in the following areas:—Stoke-on-Trent, Crewe, Chester, Liverpool, Birkenhead, and the West Lancashire Coast.

The snow, except in drifts, was generally 1 ft. deep. The main cause of the difficulty was the fine, powdery snow which drifted into points and froze, making them unworkable. At the height of the blizzard gangs of men, aided in many cases by soldiers ,worked to free the points, which had first to be found; no mean task as in the immediate vicinity of the station at Crewe alone there are 235 points. Once found and cleared the drifting snow soon clogged the points and they had to be cleared again and again. Freight traffic in several marshalling yards was at a standstill and at others trains were got away only with great difficulty.

Blackpool Central Station was completely blocked and was not free for traffic until 3 p.m. on January 20. Trains to and from Blackpool used an alternative station at Squires Gate. On the line between Bootle (Cumberland) and Silecroft a passenger train and a freight train became stuck in a snowdrift.

Long-distance passenger trains travelling through the night of January 19-20 felt the full force of the blizzard and some of them were subjected to serious delays. The 9.30 p.m. from Glasgow to Euston, arrived 17 hr. late, and other Scotch trains were similarly delayed.

During the day of January 20 and during the night of January 20-21 more snow fell and the position, particularly in the Crewe, Wigan, South Staffordshire, and Birmingham districts became worse. At 10.30 p.m. on January 22 a train carrying 800 war workers, mostly women, from the Stoke district to Crewe, was stranded in a snowdrift for 4½ hr.

Reports from Scotland on the morning of January 21 were that it was snowing hard. Snow ploughs were out in most districts and difficulty was being experienced in keeping the lines open, particularly between Abington and Lamington, and at Girvan. A blizzard north of Inverness was particularly severe in the Forsinard district. Snow continued in Scotland throughout the night of January 21-22, and the difficulties with choked points experienced south of the Border were duplicated at Edinburgh and Glasgow, and other railway centres in Scotland. The line between Carlisle and Stranraer became completely blocked and was still blocked on the morning of January 23; it was not until 4 p.m. that the trains travelling *via* Dumfries could get through. At Abington on one of the main Carlisle—Glasgow lines, a freight train became blocked in a drift, but was released during the morning of January 22.

Canadian Securities Acquired by Treasury

The British Treasury is acquiring 80 Canadian sterling and dollar securities, which comprise 33 of the Dominion Government, 2 of Harbour Commissioners, and 45 of the Canadian National Railways. The transfers of holdings of these securities is being effected by three Orders, each dated January 26, 1942. The first is the Securities (Restrictions and Returns) Order (No. 1), 1942 (S.R. & O., 1942, No. 119), under which owners in the United Kingdom are required to make a return to the Bank of England not later than March 23, of their holdings in 22 Canadian sterling securities; the second is the Acquisition of Securities (No. 1) Order, 1942 (S.R. & O., 1942, No. 120), under which the Treasury acquires these securities; and the third is the Acquisition of Securities (No. 2), Order, 1942 (S.R. & O., 1942, No. 121), under which the Treasury acquires 58 Canadian securities of which returns have already been made to the Bank of England.

The following are the description and acquisition price of railway securities to which the Acquisition of Securities (No. 1) Order applies :—

	Price per £100 nominal £ s. d.
Atlantic and St. Lawrence Railroad Capital Stock. Shares of £100 (cum coupon No. 13)	61 4 9
Canadian National Railway Company 2 per cent. 1927 guaranteed debenture stock	97 7 6
Canadian Northern Alberta Railway Company 3½ per cent. Dominion guaranteed debenture stock 1960	103 18 0
Canadian Northern Ontario Railway Company 4 per cent. perpetual consolidated debenture stock	94 17 3
Canadian Northern Ontario Railway Company 3½ per cent. Dominion guaranteed debenture stock 1961	105 8 1
Canadian Northern Pacific Railway Company 4½ per cent. 1st mortgage terminal debenture stock 1950	113 0 10
Canadian Northern Pacific Railway Company 1st mortgage 4 per cent. guaranteed debenture stock 1950	102 17 11
Canadian Northern Quebec Railway Company 4 per cent. perpetual guaranteed debenture stock	94 17 3
Canadian Northern Railway Company 4 per cent. perpetual consolidated debenture stock	95 2 4
Canadian Northern Railway Company 3½ per cent. Dominion guaranteed debenture stock 1958 (certificates denominated in sterling—London issue)	104 8 0
Canadian Northern Railway Company 1st mortgage 3 per cent. debenture stock 1953	101 7 9
Canadian Northern Western Railway Company 4½ per cent. 1st mortgage guaranteed debenture stock (Brazeau Line) 1943	101 7 9
Grand Trunk Railway Company of Canada Grand Trunk borrowed capital perpetual 5 per cent. debenture stock	126 9 8
Grand Trunk Railway Company of Canada Great Western borrowed capital 5 per cent. perpetual debenture stock (ex interest due Feb. 1)	126 9 8
Grand Trunk Railway Company of Canada 4 per cent. guaranteed stock	101 17 10
Northern Railway Company of Canada 4 per cent. debenture stock (perpetual) (ex interest due Feb. 1	103 7 11
Northern Railway Company of Canada 3rd preference irredeemable 6 per cent. bonds Class "A" (cum coupon due April 1)	115 8 10
Northern Railway Company of Canada 3rd preference irredeemable 6 per cent. bonds Class "B" (cum coupon due April 1)	115 8 10
Quebec & Lake St. John Railway Company 4 per cent. 1st mortgage debenture stock	95 7 4
St. John & Quebec Railway Company 1st mortgage 4 per cent. debenture stock	96 7 5
Wellington, Grey & Bruce Railway Company 7 per cent. 1st mortgage bonds	125 9 8

The following are the description and acquisition price of railway securities to which the Acquisition of Securities (No. 2) Order, 1942, applies. Bonds must be accompanied by all the relative coupons maturing on, or after, January 27, 1942. (cum coupon due July 1, 1931, endorsed for part payment) :—

	Price per $100 nominal £ s. d.
Canadian National Railway Company 5 per cent. 30-year guaranteed bonds (due February 1, 1954)	27 1 0
Canadian National Railway Company 5 per cent. 40-year guaranteed bonds (due July 1, 1969)	26 6 6
Canadian National Railway Company 5 per cent. 40-year guaranteed bonds (due October 1, 1969)	27 7 11
Canadian National Railway Company 5 per cent. 40-year guaranteed bonds (due February 1, 1970)	27 10 6
Canadian National Railway Company 4½ per cent. 25-year guaranteed bonds (due June 15, 1955)	26 14 9
Canadian National Railway Company 3 per cent. 9-year guaranteed bonds (due May 1, 1944)	23 5 8
Canadian National Railway Company 3 per cent. 16-year guaranteed bonds (due December 15, 1950)	22 9 8
Canadian National Railway Company 3 per cent. 13-year guaranteed bonds (due December 15, 1950)	22 9 8
Canadian National Railway Company 3 per cent. 15-year guaranteed bonds (due February 1, 1952)	22 12 4
Canadian National Railway Company 3 per cent. 17-year guaranteed bonds (due February 15, 1953)	22 10 9
Canadian National Railway Company 20-year 3 per cent. bonds (due January 15, 1959)	22 2 10
Canadian National Company 2½ per cent. 7-year guaranteed bonds (due February 1, 1944)	23 0 4
Canadian National Railway Company 7-year 2½ per cent. bonds (due January 15, 1946)	22 14 0
Canadian National Railway Company 2 per cent. 7-year guaranteed bonds (due February 15, 1943)	22 17 2
Canadian Northern Railway Company 25-year 6½ per cent. sinking fund debenture bonds (due July 1, 1946)	27 9 7
Canadian Northern Railway Company 3½ per cent. Dominion guaranteed debenture stock 1958 (Certificates denominated in Canadian currency—Canadian issue)	22 12 10
Canadian Northern Western Railway Company 4½ per cent. 1st mortgage guaranteed bonds (Brazeau Line) 1943	23 18 8
Canada Atlantic Railway Company 4 per cent consolidated 1st mortgage sterling bonds 1955	108 6 11
Canadian Northern Railway Company 3½ per cent. Dominion guaranteed debenture stock 1958 (Certificates denominated in sterling—Canadian issue)	110 3 7
Grand Trunk Western Railway Company 1st mortgage 4 per cent. 50-year gold bonds 1950—dollar bonds	21 13 8
	Price per £100 nominal
Grand Trunk Pacific Railway Company Lake Superior Branch 4 per cent. 1st mortgage sterling bonds 1955	109 8 5
Grand Trunk Pacific Railway Company 4 per cent. mortgage sterling bonds 1955 Series "A" (Prairie Section)	109 8 5
Grand Trunk Pacific Railway Company 4 per cent. mortgage sterling bonds 1955 Series "B" (Mountain Section)	109 8 5
Grand Trunk Western Railway Company 1st mortgage 4 per cent. 50-year gold bonds 1950—sterling bonds	105 8 1

44th Session of the Indian Railway Conference Association at New Delhi

Summaries of Mr. Duncan's Presidential Address and of the speech of Sir Andrew Clow, Member for Communications

On November 15, 1941, the 44th session of the Indian Railway Conference Association opened at New Delhi with the presidential address of Mr. A. Duncan, C.I.E., V.D., Agent & General Manager of the Bengal-Nagpur Railway. It began by pointing out that, due to the appointment of the preceding President, Mr. C. A. Muirhead, to a seat on the Board of the South Indian Railway in December, 1940, three months before his tenure of office would normally have expired, Mr. Duncan had assumed office correspondingly early.

Proceeding, he extended a cordial welcome on behalf of the conference to a number of high Government officials, including Sir Andrew Clow, Member for Communications; Sir Leonard Wilson, Chief Commissioner for Railways; Sir Guthrie Russell, Director-General of Munitions Production and former Chief Railways' Commissioner; Mr. T. S. Sankara Aiyar, C.I.E., Financial Commissioner, the Members of the Railway Board, and Mr. H. G. Salmond, Chief Government Inspector of Railways, in the new inspectorate established in 1941 under the Department of Communications, in place of the former inspectorate under the Railway Department.

Loss to Administrations

The President referred to the loss sustained by Indian railway administrations by the recent translation of Mr. (now Sir) B. M. Staig, former Financial Commissioner, "to a very responsible appointment in the Middle East," and voiced the good wishes of the conference to him. The speaker then proceeded to congratulate the following on recent honours bestowed upon them, namely:—

Sir Andrew Clow as a K.C.S.I., Sir Leonard Wilson and Sir Fred Carson—the recently-retired General Manager of the North Western Railway—on their knighthoods; Messrs. C. A. Muirhead, past President, I.R.C.A., and Agent & General Manager, South Indian Railway; Mr. J. D. Wertbrook, until recently Agent & General Manager, Bengal & North Western Railway; and Khan Bahadur Muzaffar Hussain, Member of the Railway Board, who have received the C.I.E.

He also included a number of O.B.E.'s and other honours.

Mr. Duncan next alluded to the recent deaths of four outstanding personalities, who had been closely connected with the association: Sir Ernest Jackson, former Agent, Bombay Baroda & Central India Railway; Mr. A. M. Clark, late Agent, Bengal-Nagpur Railway; Mr. D. Ross-Johnson, C.B.E., Secretary of the association, 1907-11, and Mr. J. Fearfield, C.I.E., Manager, Bikanir State Railway, until his death in June last. The President welcomed the return of Mr. Frank D'Souza, C.I.E. (late Member of the Railway Board), to the railway fold as Mr. Fearfield's successor, and as B.S.R. delegate to the conference.

Turning to the agenda of the session, the President pointed out that war conditions brooked of no "philandering with time" and the programme of deliberations was, therefore, "short and sharp"; the excellence of the work performed by the various technical and other committees alone made it possible to conclude proceedings in two working days. For this same reason he refrained from dilating on the war efforts of the railways and the railway transport problem.

Concluding he expressed the indebtedness of the association to Mr. Dean, the General Secretary, and other members of the organisation, and to Mr. Raper, Member (Transportation) Railway Board for his constant liaison with Mr. Dean in connection with wagon pool and interchange problems.

War Achievements

Sir Andrew Clow followed his precedent of a year earlier of devoting most of his speech to the war achievements of the railways. Since then railways had made large sacrifices and with reduced resources had had to meet exceptional demands. Three large workshops had been handed over for war supplies as well as a considerable proportion of the capacity of many others. Over 13,000 men in railway shops were working on munitions, and thousands of others were training for workshops or other railway units. Much permanent way had been sent overseas, partly as a result of pulling up lines that could comparatively-easily be spared, and partly by release from relaying. Great quantities of stores and other equipment had also been surrendered for India's far-flung lines of defence, including some 200 locomotives and over 10,000 other vehicles. Heavy additional traffic now offering had to be met with reduced resources, as demands for new rails, rolling stock, and structures had had to be cut down to the absolute minima.

On the other hand, over 200 officers had been released for service with the Defence and Supply Departments, and a force of over 20,000 men was being recruited and trained for railway military units. As an example of the traffic demands, partly for defence, the speaker mentioned that over 2,000 special trains had been run for the army and its prisoners alone during the previous 12 months. Rapidly-increasing industrialisation throughout the sub-continent and increased prosperity of the masses, together with restrictions on transport by sea and road had also thrown a greatly increased burden upon the railways.

At the close of the session Mr. Misra proposed a vote of thanks to the President, which was seconded by Lt.-Colonel Slaughter and suitably acknowledged by Mr. Duncan.

Mr. G. C. Laughton, C.I.E., J.P., General Manager of the B.B. & C.I.R. was elected President of the I.R.C.A. for the ensuing session, 1942-43.

Permanent Way Institution's Fifty-eighth annual winter meeting

The 58th Annual Winter General Meeting of the Permanent Way Institution was held at the Great Eastern Hotel, Liverpool Street, London, E.C., on Saturday, January 31, with the President, Mr. F. E. Harrison, in the Chair. A representative gathering of members was present including three past Presidents, Messrs. R. Carpmael, S. L. Murgatroyd, and W. Wallace.

The Secretary (Mr. H. Janes) reported that during the past year there had been a slight improvement in the number of section meetings held, and specifically mentioned the activities of the Manchester & Liverpool, North Wales, and Notts & Derby Sections, which had kept to pre-war standard. On September 15 the council approved the affiliation of a new section in India serving the area covered by the Great Indian Peninsula, and the Bombay, Baroda & Central India Railways. This section, with headquarters at Bombay, will be known as the Bombay & Western India Section, and the local secretary is Mr. K. C. Bakhle of the G.I.P.R. The South India Section also continued to progress, and fourteen meetings had been held in 1941. The institution had enrolled 210 members during the year, and of this number 108 were from India. Of home railways the figures were L.M.S.R. 74, Southern 11, L.N.E.R. 3, and G.W.R. 3. Applications for membership had also been received from Malaya, Argentina, Kenya, Eire, and Newfoundland.

As usual, three *Journals* had been issued, but due to paper restrictions, the page content of future issues would be drastically curtailed. It was, however, hoped to offset this to some extent by modifying layout, type, and so forth.

Mr. Wallace then moved the re-election as President of Mr. F. E. Harrison. Mr. Wallace said that in the ordinary course of events the President could have expected to have been relieved of the onerous duties after having carried on for three years, but they could not do better than ask Mr. Harrison to continue. Mr. Murgatroyd seconded the proposal, which was agreed to with acclamation.

President's Reply

Expressing thanks for the members' continued confidence, Mr. Harrison agreed to carry on for 1942. He thought, however, that there were other Chief Engineers eminently suitable for the position of President, and hoped that next year a change could be effected. If circumstances were still as difficult as now a new President could just carry on, and then in a short time—he hoped—matters might return to normal, and the usual activities of the institution recommence. Mr. Harrison went on to say that he had certain ideas of reform in procedure, etc., that he had hoped to bring forward, but the outbreak of hostilities had prevented matters being pursued. As to sections, the sympathy of all was accorded to the members of the section in Malaya. He knew little about Malaya, and on looking for something mentioning railways he turned up THE RAILWAY GAZETTE in which appeared a map which told one more in a brief time than any of the maps which had appeared in newspapers. In conclusion the President said he was sure they would like him to say how indebted they were to Mr. Janes (Secretary) and Mr. Lawson (Treasurer) for carrying on under difficulties.

Vice-Presidents were elected as follow: *England*, Mr. D. R. Bennett, *Scotland*, Mr. R. C. Rattray, *Ireland*, Mr. C. J. Murphy, *Wales*, Mr. C. R. Irving, *India*, Mr. J. F. C. Hanson, *Malaya*, Mr. M. L. Cobb, *Sudan*, Mr. C. Mackinnon. The Secretary, Mr. H. Janes, and Treasurer, Mr. F. Lawson, were re-elected.

Railway Post Offices in the U.S.A.

The familiar travelling postal sorting offices, which for more than a century have formed part of the British railway service and are known familiarly as T.P.Os. (travelling post offices), have their counterpart in the U.S.A. in what are there termed R.P.Os. (railway post offices). From the early days of railways in the U.S.A. until 1867, mail was carried in small compartments on railway cars, each of which was in charge of a single mail agent. Usually he delivered to various stations the mails intended for the towns along his line. The mail agent operated only in the daytime, giving the service along the line every day, in each direction. There was no night service at all, save for a "through-bag" for great population centres like Chicago. Only to certain large designated "distributing post offices" was mail sent in separate packages; these letters necessarily were detained for as much as 24 hours for sorting and distribution. Incidentally, it was probably Benjamin Franklin, first Postmaster General under the Continental Congress, who required that every package of letters for every town, big and little, should be done up with a bill of the letters it contained, and wrapped in a special kind of brown paper; and that each package be directed to its post office destination, where it was to be opened and the letters sorted for delivery.

In 1861 Assistant Postmaster George B. Armstrong, Chicago, worked out a plan to improve postal service. His idea was for a kind of postal car to be hauled by railways. Unfortunately, the test of this, deferred because of the Civil War, was not authorised by the Post Office Department until July 1, 1864. In August of that year the first railway postal car in the U.S.A. was established on the Chicago & North-Western Railway, between Chicago and Clinton, Iowa; the first complete car, built from Mr. Armstrong's plans, three years later, was placed in service between Boone and Council Bluffs, Iowa. Pacific Coast overland mail then could be despatched from Chicago by regular train, and "worked" by railway mail service clerks between Boone and Des Moines, Iowa, avoiding the delay of a layover at some distributing post office. For example, by the time the sorting of mail would have been completed at Omaha, the mail now would be 500 miles on its way over the Rockies.

THE INSTITUTE OF TRANSPORT.—At a lunch-hour informal meeting held on January 20, Mr. M. A. Cameron (Member of Council), Assistant Goods Manager, L.N.E.R. (Southern Area), opened a discussion on "Security or Progress, with special reference to transport." He submitted that economic security was becoming a war aim and asked whether, if the search for security should involve the unification of service industries (notably transport), progress could be maintained. He pointed out that unification in the service of communications had not prevented progress; the transport problem was bigger, but could be handled with proper organisation, the principles of which were discussed. An interesting discussion followed in which there took part: Messrs. R. Bezzant, M. R. Bonavia, S. B. Budworth, C. E. W. Duley, A. C. Knight, C. F. Klapper, G. J. Ponsonby, C. E. Whitworth.

Notes and News

Bishopstone Beach Halt Closed.—As from January 1, Bishopstone Beach Halt, on the Seaford branch of the Southern Railway, has been closed for traffic.

U.S. Railway Freight Loadings.—Statistics issued by the American Railway Institute show that loadings of revenue freight for the week ended January 24 totalled 817,800 wagons.

The Cold Wave in Europe.—Road and rail traffic have been stopped in many parts of Sweden, by reason of heavy snow and severe cold (reported to be the coldest recorded since 1875), according to a message of January 26 from Stockholm. For similar reasons, many train services have been suspended in Hungary and Roumania, and road traffic has been interrupted. Communication between Turkey and Bulgaria is also said to have been suspended.

Train Collides with Debris of Overbridge on L.M.S.R.—Due to the skidding of a motor-hearse, causing it to strike the parapet of an overbridge near Wigton, Cumberland, and dislodge the masonry, the Whitehaven-Carlisle line of the L.M.S.R. became blocked by the debris and a passenger train ran into the obstruction late in the evening of February 1. Buses were used to send passengers forward. The train suffered a good deal of damage, but no person appears to have been seriously hurt.

Bus and Rail in the U.S.A.—The Interstate Commerce Commission has reversed the finding of its previous report and has authorised the Mobile & Ohio Transportation Company to acquire control of the St. Louis Red Bud & Chester Motor-bus & Service Corporation through purchase of capital stock. The Mobile & Ohio Transportation Company is a subsidiary of the Gulf, Mobile & Ohio Railroad, and the newly-acquired bus undertaking had been providing a connecting service for the G.M. & O. trains at St. Louis. Plans are being formulated to extend co-ordination.

Uruguayan State Railways.—At the beginning of 1941 the rolling stock of the Uruguayan State Railways (Ferrocarriles del Estado) consisted of the following: 18 steam locomotives, 46 motor coaches, 23 passenger cars, 18 luggage vans, 580 goods wagons, 2 road motor lorries, and 2 road trailers. In addition, the administration has 4 locomotives which are not in service. The only new equipment purchased by the Uruguayan State Railways in 1939 was 15 Hungarian Ganz motor coaches. These are used on their own lines and also leased to the British-owned railway companies in Uruguay.

Fatal Collision at Cowlairs, Glasgow, L.N.E.R.—An L.N.E.R. Edinburgh-Glasgow express, due to reach Queen Street terminus at 5.0 p.m. collided, on January 30, practically head-on with a light engine near Cowlairs Station; the leading vehicle was destroyed and much damage was done to others. Several persons were killed and others fatally injured; the death roll has now reached 13. Many others were injured. The following statement was issued by the L.N.E.R. after the accident: "The L.N.E.R. much regrets to announce that at about 4.56 this afternoon the 4 p.m. Edinburgh to Glasgow train collided with a light engine at Cowlairs East Junction. Several coaches were damaged or derailed, and, so far as can be ascertained at present, eight persons were killed and 25 injured. The cause of the accident will be the subject of an inquiry."

Days Lost in Trade Disputes.—According to the Ministry of Labour & National Service, there were 1,267 stoppages of work as the result of trade disputes in the year 1941, of which 37 lasted over two weeks. The total number of working days lost was 1,075,000, equal to one day in 12 years for each worker. Compared with the 1914-19 war the total of days lost in 1941 is considered small; in 1914 days

British and Irish Railway Stocks and Shares

Stocks	Highest 1941	Lowest 1941	Prices Jan. 30, 1942	Prices Rise/Fall
G.W.R.				
Cons. Ord.	43¾	30¾	45	—
5% Con. Pref.	109½	83½	110½	+ 1
5% Red. Pref. (1950)	105½	96½	106	—
4% Deb.	113¾	102½	114½	—
4½% Deb.	115	105⅝	114½	—
4½% Deb.	121½	112	122½	+ 1
5% Deb.	132	122	131	+ 1
2½% Deb.	70	62⅜	69	—
5% Rt. Charge	129½	116	129½	—
5% Cons. Guar.	128	110½	129½	—
L.M.S.R.				
Ord.	17½	11	18½	—
4% Pref. (1923)	53	33½	53	+ ½
4% Pref.	68½	48½	71	+ 1
5% Red. Pref. (1955)	97⅛	77	95½	—
4% Deb.	105⅛	97	107	— ½
5% Red. Deb. (1952)	110½	106½	109½	—
4% Guar.	100	85⅛	101½	—
L.N.E.R.				
5% Pref. Ord.	3⅜	2⅜	3⅜	—
Def. Ord.	2	1¼	2¼	—
4% First Pref.	52½	33	52	+ ½
4% Second Pref.	19⅜	10	20	—
5% Red. Pref. (1955)	79½	52	81	—
4% First Guar.	90½	74½	92½*	—
4% Second Guar.	80½	59	82½*	+ 2
3% Deb.	79⅛	68⅜	79½	—
4% Deb.	104	91½	105	—
5% Red. Deb. (1947)	106	102½	104	—
4½% Sinking Fund Red. Deb.	103½	99⅛	102½	—
SOUTHERN				
Pref. Ord.	65½	43½	64½	+ 1
Def. Ord.	15⅜	9	17	+ ½
5% Pref.	107	77½	107½	+ 1
5% Red. Pref. (1964)	107	89½	107	—
5% Guar. Pref.	128	111	129½	—
5% Red. Guar. Pref. (1957)	114½	107½	114½	+ 1
4% Deb.	112	102½	113½	—
5% Deb.	130½	119	133	+ 3
4% Red. Deb. (1962–67)	108½	102	107½	—
4% Red. Deb. (1970–80)	108⅜	102½	107½	—
FORTH BRIDGE				
4% Deb.	99½	90½	98½	—
4% Guar.	99	85½	98½	—
L.P.T.B.				
4½% "A"	120½	109½	119½	—
5% "A"	130½	115½	129½	— 1
4½% "T.F.A."	103½	99½	100½	—
5% "B"	117	102	119½	— 1
"C"	46½	28⅜	40	—
MERSEY				
Ord.	24½	19½	22½	—
4% Perp. Deb.	100	90	99½	—
3% Perp. Deb.	73½	63	72½	—
3% Perp. Pref.	58	51½	57	—
IRELAND				
BELFAST & C.D.				
Ord.	4	4	4	—
G. NORTHERN				
Ord.	14½	3	14½	+ ½
G. SOUTHERN				
Ord.	14½	5	10½	—
Pref.	17	10	12½	— 1
Guar.	44	16	42	—
Deb.	61	42	56½	+ ½

* ex dividend

OFFICIAL NOTICES

Official Notice

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is 9.30 a.m. on the preceding Friday. All advertisements should be addressed to:—*The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

IT is desired to secure the full commercial development in the United Kingdom of BRITISH PATENT NO. 458,678, which relates to Regenerative transmission systems for vehicles, either by way of the grant of licences or otherwise on terms acceptable to the Patentee. Interested parties desiring copies of the patent specification and further particulars, should apply to STEVENS, LANGNER, PARRY & ROLLINSON, 5 to 9, Quality Court, London, W.C.2.

lost due to industrial disputes were nearly 10,000,000; in 1915 and 1916, nearly 3,000,000; in 1917, over 5,600,000; and in 1918, nearly 6,000,000.

Companies Struck Off Register.—The names of the following companies, were on January 27 struck off the Register and such companies are thereby dissolved: Patent Axle-Box & Foundry Co. (1934) Ltd.; C.C. Wagons Limited; Isle of Wight Ferry Co. Ltd.; Pride of the East Coaches Limited; Supreme Air Services Limited.

Chilean Electric Locomotives.—An order for eight 40-ton electric locomotives has been placed in the U.S.A. by the Cia. Galitrea de Tarapaca y Antofagasta. They are to operate off 500 volts d.c. in open pit mines and marshalling yards, and will haul trains for five miles between the faces and the mills. A double-bogie layout is being adopted and dynamic braking is to be incorporated; the top designed speed is 35 m.p.h.

Railcars in Brazil.—The administration of the Rio Grande do Sul Railway is much concerned with the results of bus competition, but the introduction of 23 streamline petrol railcars has achieved considerable success in retrieving traffic. These railcars have been built in the railway workshops. Each seats 42 passengers and has a small luggage compartment; the power unit is in some cases of 90 h.p. and in others of 120 h.p.

Great Southern Railways (Eire).—For the 3rd week of 1942 the Great Southern Railways (Eire) reports passenger receipts of £30,142 (against £29,340), and goods receipts of £60,867 (against £43,120), making a total of £91,009, against £72,460 for the corresponding period of the previous year. The aggregate receipts to date are passenger £94,655 (against £95,521), goods £196,462 (against £149,017), making a total of £291,117 (against £244,738).

Public Utilities Coal Stocks.—Lord Falmouth, President of the Conjoint Conference of Public Utility Associations, stated on January 28 that supplies and stocks of coal required by public utility undertakings were now much easier than a year ago, when the position had been a cause of serious anxiety. Nevertheless he drew attention to the growing fuel demands of the war factories and stressed the valuable results being achieved by the fuel economy campaign instituted by the Mines Department with the co-operation of the fuel industries for the purpose of diverting coal, gas, and electricity to meet essential national needs.

Ambulance Classes for Railway Women.—The 1941 report of the L.M.S.R. Ambulance Centre shows that women railway workers are taking an increasing interest in first aid. Some 38 "women only" classes have been begun during the year. Women workers have also joined "mixed" classes, allowed by the St. John authorities for the duration of the war. Altogether some 7,476 L.M.S.R. railwaymen and women are qualified first aid workers, of whom 4,782 have passed fourth and subsequent years' examinations. Since the formation of the L.M.S.R. Ambulance Centre, 9,190 workers have been awarded long service medals and bars.

Home Railway Dividends.—According to present arrangements it is understood that the boards of the four main-line railway companies intend to make their announcements of earnings and dividends in respect of 1941 on the following dates: London Midland & Scottish Railway Company, February 18; Southern Railway Company, February 19; and Great Western Railway Company and London & North Eastern Railway Company on February 20. It is expected that the London Passenger Transport Board will meet on February 19 to consider the interest payment on the "C" stock.

Transport after the War.—Sir Ernest Lemon, Chairman of the Railway Companies' Association Commission on Post-War Planning and Reconstruction, is reported as having told a *Sunday Express* reporter that after the war there would be a general demand for greater speed. The *Sunday Express*, in its interview with Sir Ernest Lemon, states that much greater use of air transport for passenger and light goods traffic is likely to be made by the railways after the war. It is unlikely that the railways will be able to build air ports near London termini because of the limited space available, but one central air port has been suggested. This, it is pointed out by that newspaper, could be constructed by King's Cross Station, and might be included in the rebuilding scheme.

Railway and Other Reports

Great Northern Railway Company (Ireland).—The directors have decided to pay a dividend of 1 per cent. on the ordinary stock for 1941 of 1 per cent., which is the first payment since ½ per cent. was distributed in respect of 1931. They also recommend the payment of 4 per cent. on the non-cumulative consolidated 4 per cent. preference stock, which has not received a dividend since that paid on March 1, 1932. The consolidated 4 per cent. guaranteed stock will receive 4 per cent. in addition to the dividends of 4 per cent. per annum for the years 1939 and 1940, paid on October 1 last. The dividends are payable, less tax, on April 1 next.

Bengal & North Western Railway Co. Ltd.—The directors in their interim statement for the half-year to September 30 last show that gross earnings were Rs. 2,10,47,000 (Rs. 2,01,98,675), working expenses Rs. 92,45,000 (Rs. 92,04,836), and net earnings Rs. 1,18,02,000 (Rs. 1,09, 93, 839). The company's share of net earnings in sterling (at 1s. 6d. to the rupee) after deduction of Indian income tax and net Indian charges was £361,350 (£372,134). The board, after appropriating one year's interest on reserves amounting approximately to £81,400, has declared a further interim dividend of 7 per cent., together with a bonus of 3 per cent., less tax at 5s. 3d., on the ordinary stock, making 18 per cent. for the year, compared with 16 per cent. for 1939-40.

Rohilkund & Kumaon Railway Co. Ltd.—The interim report for the half-year to September 30, 1941, shows gross earnings of Rs. 49,03,000 (Rs. 46,27,329), working expenses Rs. 23,11,000 (Rs. 21,37,070), with an operating ratio of 47·13 per cent. against 46·18 per cent., and net earnings Rs. 25,92,000 (Rs. 24,90,259). The company's share of net earnings in sterling at 1s. 6d. to the rupee, after deduction of Indian income tax and net Indian charges, etc., amounted to £65,550 (£74,601). An interim dividend has been declared of 6 per cent., and a bonus of 7 per cent., less tax at 5s. 5d., on the ordinary stock.

Contracts and Tenders

The Bengal-Nagpur Railway has placed the following orders, to the inspection of Messrs. Wolfe Barry, Robert White & Partners:—

Priestman Bros. Ltd: 10 bevel pinion wheels for coaling grab cranes;
Lindley & Co. Ltd.: 36 copper firebox plates.

The Canadian Car & Foundry Company is working on an order for 2,500 box cars for the South African Railways & Harbours.

The Sorocabana Railway has ordered from the United States ten 2-6-6-2 electric locomotives of 143 tons each, for freight and passenger service. Delivery is expected in December, 1942.

The National Railways of Mexico have purchased in the United States 40 goods locomotives, of three sizes. They recently took delivery of 4 rebuilt locomotives bought in the United States, and are to acquire 2 more.

Class I railways in the U.S.A. installed 72,440 new freight wagons in service in the first eleven months of 1941, reports the Association of American Railroads. New freight wagons put in service in the same period the previous year totalled 59,473. Of the total number of new freight wagons installed in the eleven months of 1941 there were 39,205 box, 28,786 coal, 1,682 flat, 2,007 refrigerator, 145 stock and 615 miscellaneous wagons.

New locomotives installed in service totalled 557, of which 136 were steam and 421 electric and diesel. For the same period in 1940 the figure was 367, of which 104 were steam and 263 electric and diesel.

Class I railways on December 1, 1941, had 76,942 new freight wagons on order, compared with 30,684 on the same day in 1940. The new freight wagons on order consisted of 50,968 box, 21,392 coal, 304 stock, 1,961 flat, 1,583 refigerator, and 734 miscellaneous. They also had 572 new locomotives on order on December 1, of which 281 were steam and 291 electric and diesel. New locomotives on order on December 1, 1940, totalled 182 and consisted of 116 steam, and 66 electric and diesel.

Railway Stock Market

Inactive conditions have ruled in the stock and share markets, where sentiment was governed by the disposition to await the next war developments. British Funds were inclined to be less active, but maintained a steady undertone, aided by the further sums that will become available for re-investment due to the requisitioning of Canadian stocks. Home railway prior charges were also assisted by the latter factor, and at the time of writing the junior issues have provided one of the brightest features on the Stock Exchange. Announcement of the dates of the forthcoming dividend declarations tended to attract more attention to the junior stocks; in some quarters there has been continued vague talk of the possibility of the stocks being quoted in units of £1. L.M.S.R. ordinary and Southern deferred have been active in response to hopes of small increases in the distributions. Moreover, there are hopes that the position as to war damage contributions will be clarified in the near future. Yields at current prices remain substantial, and it would seem there would be scope for a strong upward movement in values if there were shown to be a sound basis for the view that, during the period of the war, dividends are likely to be at least maintained at the rates which ruled for 1940. In other directions there has been a general decrease of business in South American railway securities following their recent upward trend. Those of the Chilean companies were affected by modification of market talk of the prospect of intense activity developing in the nitrate industry. Consequently, Antofagasta, Taltal, and Nitrate Rails issues lost part of their recent advance. Elsewhere, Leopoldina issues have been reactionary on the proposals to extend the moratorium. Although Canadian Pacific common stock was little changed awaiting the decision as to a dividend, there was a strong rise in the preference stock. The disposition is to assume that increasing attention will be given to C.P.R. issues as they will be among the relatively few securities left in the Canadian railway market, after the requisitioning of stocks of the Canadian National, Canadian Northern and Grand Trunk railways.

Despite small fluctuations, Great Western ordinary was higher on balance at 44⅞, compared with 44½. The guaranteed stock remained at 129½, and the 5 per cent. preference was half-a-point higher at 110½, as were the 4 per cent. debentures at 114½. Activity has been shown in L.M.S.R. on dividend estimates, and the price has further improved from 18¼ to 18⅝ at the time of writing. The apparently generous yield attracted attention to this railway's 1923 preference, which improved from 52 to 53½; the senior preference was a point higher at 71. L.M.S.R. 4 per cent. debentures remained at 107, but the 4 per cent. guaranteed again moved higher to 102. There was larger demand for L.N.E.R. guaranteed issues; the firsts were half-a-point up at 92½; the seconds rose three points to 83½. L.N.E.R. first preference also attracted attention, and is 52½ at the time of writing, which, however, is still a point below L.M.S.R. 1923 preference. L.N.E.R. second preference was unchanged on balance at 20; this railway's 4 per cent. and 3 per cent. debentures were the same as a week ago. Southern deferred remained active on market talk of the possibility of a 2 per cent. dividend, but at the time of writing has eased to 16⅝, which compares with 17 a week ago. On the other hand, the preferred stock was fractionally higher at 64½. Southern preference was higher at 107½, while the 4 per cent. debentures gained half-a-point to 114½, and the guaranteed stock remained at 129½. London Transport "C" was unchanged at 40¾.

Among South American railway securities, Antofagasta preference moved back to 37½, Nitrate Rails to 68s. 9d., and Leopoldina debentures to 32. San Paulo ordinary were slightly lower at 46½. Elsewhere, B.A. Gt. Southern 4 per cent. debentures eased to 60. At the time of writing, Central Argentine debentures have held their recent improvement. Elsewhere, Canadian Pacific preference stock at 69 showed a strong rise on balance.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1941-42	Week Ending	Traffic for Week: Total this year	Traffic for Week: Inc. or Dec. compared with 1941	No. of Weeks	Aggregate Traffics to date: Totals: This Year	Aggregate Traffics to date: Totals: Last Year	Aggregate Traffics to date: Increase or Decrease	Shares or Stock	Prices: Highest 1941	Prices: Lowest 1941	Prices: Jan. 30 1942	Yield % (See Notes)
				£	£		£	£	£					
South & Central America	Antofagasta (Chili) & Bolivia	834	25.1.42	20,790	+ 2,020	4	81,640	68,050	+ 13,590	Ord. Stk.	10¾	3 11/16	11	Nil
	Argentine North Eastern	753	24.1.42	ps. 150,000	+ ps. 25,100	30	ps. 5,489,800	ps. 4,646,900	+ ps. 842,900	"	4	1	3½	Nil
	Bolivar	174	Dec., 1941	4,500	+ 1,800	52	47,694	45,200	+ 2,494	6 p.c. Deb.	5	5	7	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds	8	2 13/16	10	Nil
	Buenos Ayres & Pacific	2,801	17.1.42	ps. 1,550,000	— ps. 147,000	29	ps. 38,503,000	ps. 35,133,000	+ ps. 3,370,000	Ord. Stk.	7½	1½	6¼	Nil
	Buenos Ayres Great Southern	5,082	24.1.42	ps. 2,793,000	+ ps. 352,000	30	ps. 68 812,000	ps. 60,054,000	+ ps. 8,758,000	Ord. Stk.	10¼	3½	10	Nil
	Buenos Ayres Western	1,930	24.1.42	ps. 969,000	+ ps. 234,000	30	ps. 24,896,000	ps. 20,680,000	+ ps. 4,216,000	"	9	2½	8½	Nil
	Central Argentine	3,700	24.1.42	ps. 1,832,000	+ ps. 171,750	30	ps. 52,727,250	ps. 42,502,400	+ ps. 10,224,850	"	8¼	2¼	7½	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	2½	½	3	Nil
	Cent. Uruguay of M. Video	972	24.1.42	ps. 23,802	— 3,513	30	685,678	632,150	+ 53,528	Ord. Stk.	9½	1	7½	Nil
	Costa Rica	188	Nov., 1941	23 078	+ 2,298	22	114 236	93 515	+ 20,721	Stk.	15½	11¼	13½	14 16/16
	Dorada	70	Dec., 1941	12,840	+ 540	52	148 870	146 500	+ 2,370	1 Mt. Db.	97	97	90½	6 8/16
	Entre Rios	808	24.1.42	ps. 215,300	+ ps. 10,300	30	ps. 7,923,800	ps. 6,551,800	+ ps. 1,372,000	Ord. Stk.	6½	½	7	Nil
	Great Western of Brazil	1,030	24.1.42	13,700	+ 1,300	4	44,500	43,800	+ 700	Ord. Sh.	11/-	1/-	1/-	Nil
	International of Cl. Amer.	794	Nov.,1941	$431.078	+ $79,499	48	$5,097,659	$5,098,199	— $540	—	—	—	—	—
	Interoceanic of Mexico	—	—	—	—	—	—	—	—	1st Pref	⅜	6d.	½	Nil
	La Guaira & Caracas	22¼	Dec.,1941	5,675	+ 945	52	78.050	77 230	+ 820	—	—	—	—	—
	Leopoldina	1,918	24.1.42	28,808	+ 6,245	4	94,715	79,742	+ 14,973	Ord. Stk.	4½	¼	4½	Nil
	Mexican	483	21.1.42	ps. 324,700	+ ps. 26,800	3	ps. 886,400	ps. 834,100	+ ps. 52,300	"	⅜	¼	1	Nil
	Midland of Uruguay	319	Nov.,1941	12,157	+ 975	22	66,948	57 186	+ 9,762	—	—	—	—	—
	Nitrate	386	15.1.42	5,473	+ 926	2	5,473	4 547	+ 926	Ord Sh.	66/-	1 1/16	3 7/16	3⅜
	Paraguay Central	274	24.1.42	$2,704,000	— $1,704,000	30	$103,543,000	$99,411,000	+ $4,132,000	Pr. Ll. Stk	43½	29	42⅛	7 7/16
	Peruvian Corporation	1,059	Dec., 1941	76,699	+ 11,843	26	432,542	393 325	+ 39,217	Pref.	6 3/16	1 1/16	9	Nil
	Salvador	100	Nov.,1941	c53,000	+ c15,000	22	c244 172	c 203.683	+ c40.489	—	—	—	—	—
	San Paulo	153¾	18.1.42	35,000	+ 13	3	77,375	88,605	— 11,230	Ord. Stk.	52	24½	47	4¼
	Taltal	160	Dec., 1941	2.430	— 775	26	27,760	17,140	+ 10,620	Ord. Sh.	1½	6/-	1½	Nil
	United of Havana	1,346	24.1.42	21,043	+ 246	30	579,873	456.669	+ 123,204	Ord. Stk.	2⅜	⅛	4	Nil
	Uruguay Northern	73	Nov.,1941	1,294	— 62	22	6,686	5,631	+ 1,055	—	—	—	—	—
Canada	Canadian National	23,560	21.1.42	1,157,400	+ 221,200	3	3,286,000	2,779,800	+ 476,200	—	—	—	—	—
	Canadian Northern	—	—	—	—	—	—	—	—	Perp. Dbs	94⅞	85½	—	—
	Grand Trunk	—	—	—	—	—	—	—	—	4 p c. Gr	104 1/16	99½	—	—
	Canadian Pacific	17,137	21.1.42	831,600	+ 176,400	3	2,306,600	1,944,200	+ 362,400	Ord. Stk	13	7⅛	12	Nil
India†	Barsi Light	202	10.11.41	4,297	— 8,138	30	107,340	98,700	+ 8,640	—	—	—	—	—
	Bengal & North Western	2 099	Dec., 1941	295.575	+ 52,505	13	824,100	757.001	+ 67,099	Ord. Stk	345	253	340	4⅛
	Bengal-Nagpur	3,269	10.10.41	234,750	— 14,924	27	4,993,938	4.533,077	+ 460,861	"	101¼	95⅜	100⅜	4
	Bombay, Baroda & Cl. India	2,986	31.12.41	369,750	+ 36,300	39	8,119,875	7.440,150	+ 679,725	"	98½	92	97⅜	6¼
	Madras & Southern Mahratta	2,939	10.11.41	192,225	+ 38,516	30	4,400.295	3,653,868	+ 746,427	"	105 1/16	101¼	102⅜	7⅛
	Rohilkund & Kumaon	571	Dec.,1941	56.550	— 639	13	153,825	153 064	+ 761	"	342	290	340	4⅜
	South Indian	2,402	10.11.41	138,100	+ 31,687	30	3,252,278	2,804,705	+ 447,573	"	100	87	99½	3½
Various	Beira	204	Oct.,1941	82,103	—	4	82,103	—	—	—	—	—	—	—
	Egyptian Delta	610	31.10.41	11,565	+ 1,176	29	168,612	117,730	+ 50,882	Prf. Sh.	1½	29/-	2½	Nil
	Manila	—	—	—	—	—	—	—	—	B. Deb	68	45	50	7
	Midland of W. Australia	277	July, 1941	18.648	+ 7,251	4	18.648	11.397	+ 7.251	Inc. Deb.	90½	85½	89½	6 8/16
	Nigerian	1,900	25.10.41	41,081	+ 9,811	30	1,483,406	1.059,899	+ 423,507	—	—	—	—	—
	Rhodesia	2,442	Oct., 1941	482.053	—	4	482,053	—	—	—	—	—	—	—
	South Africa	13,291	6.12.41	830 254	+ 88,720	36	27,366,890	24,608.762	+ 2,758 128	—	—	—	—	—
	Victoria	4,774	Sep. 1941	1,052,397	+ 161,210	13	3,053,542	2,648,904	+ 404,638	—	—	—	—	—

Note. Yields are based on the approximate current prices and are within a fraction of ⅛ Argentine traffics are given in pesos
† Receipts are calculated @ 1s. 6d. to the rupee § ex dividend